6. THE PELL PROGRAM AT THIRTY YEARS

Bradley R. Curs, Larry D. Singell, Jr.* and Glen R. Waddell

University of Missouri-Columbia, University of Oregon and University of Oregon

THE PELL PROGRAM AT THIRTY YEARS

For more than 30 years the Pell program has provided a voucher-like subsidy, for low-income students who apply for financial aid, to any qualifying college or university in the country. In 2005, the Pell program provided over $12 billion in grants to more than a fifth of all college students. However, despite the significant resources spent on need-based financial aid in the United States, the gap between low- and high-income students' matriculation rates into post-secondary education has not only persisted but has widened in the last three decades (e.g., Ellwood & Kane, 2000). Disparate college attainment across socio-economic status is of particular concern to policy makers and university administrators because the percentage difference in earnings between college and high-school graduates has grown dramatically over the same period – from 19 percent in 1980 to 50 percent in 1997, for 25 to 34-year-old males. Combined with above-inflation increases in the cost of college and an increasing proportion of college-age students attending colleges these factors have contributed to mounting pressure by consumers, providers, and overseers of higher education to reform the Pell program and other components of the U.S. financial aid system (e.g., McPherson & Schapiro, 1997; Ehrenberg, 2000). To the extent that potential shortcomings of the system may be mitigated by a serious account of the related academic literature, our analysis aims to inform future policy proposals on the quantifiable outcomes of Pell on the access, choice, and persistence of low-income students.

*Department of Economics, University of Oregon, Eugene, OR 97403-1285. Phone (541) 346–4672. E-maxil: lsingell@uoregon.edu

Curs, Singell, and Waddell: *The Pell Program at Thirty Years*

Following our introduction, we organize the subsequent material into five sections. The background section provides background information regarding the program history and an empirical description of the distribution of Pell funds to individuals. The first part of the background section describes how the mission and generosity of the program has changed over time due to explicit executive, legislative, and judicial action. In addition, we describe the budgeting process that has frequently constrained the funded level of Pell awards to be less than the value authorized by the Pell program, more generally. As we will discuss, the best empirical studies assessing the efficacy of the Pell program have exploited precisely these changes in the parameters, design, and funding of the program as a means of isolating exogenous sources of variation in need-based aid. The background section also provides a descriptive analysis that documents how the various reforms to the Pell program affected real outcomes, such as qualification criteria and levels of financial support. The descriptive evidence indicates that a combination of explicit reforms and government inaction led to a move away from an explicit focus on young, full-time, low-income students and a general decline in the purchasing power of the Pell award.

With the context of history in mind, we then examine in the demand-side section whether the Pell program has successfully improved (increased) the college outcomes (demand) of low-income students. First, we generally describe how the regular and sometimes significant changes in Pell-program parameters brought about by the reauthorization process can generally be exploited using a *natural experiment* (quasi-experimental) methodology. This discussion of natural experiment design highlights the importance of controlling for the potential endogeneity of aid provided to low-income students, which may bias the estimated impact of Pell aid on college outcomes. The remaining subsections sequentially discuss the empirical evidence regarding the efficacy of the Pell program on access and persistence. In general, the summary of evidence suggests that the Pell program, while possibly improving access for particular types of students (e.g., independent students), does not generally entice low-income students into college if not previously inclined to attend. Further, it does not necessarily permit a low-income student to persist in college once enrolled.

If nothing else, a quick history of the Pell program reveals that student and university interests do not always align in regards to the generosity of the Pell program. In the supply-side section we provide

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descriptive evidence that the institutional distribution of Pell revenues has shifted toward two-year and less-selective four-year institutions over time, suggesting that Pell policy can have important effects on supply of higher education. In this light, we discuss one particular misalignment of student and university interests that has come to be known as the Bennett hypothesis (after former Education Secretary William Bennett) that contends that federal aid can create an incentive for universities to rent-seek at the expense of students. A summary of the empirical evidence shows that the Pell program can yield upward pressure on tuition that could offset the potential access and persistence effects of Pell aid. However, contrary to the Bennett hypothesis, some empirical evidence suggests that universities may well *price discriminate* in order to improve access of the neediest students. Nonetheless, this literature shows that supply-side impacts of federal aid programs cannot necessarily be ignored and could potentially offset the intended demand-side effects of the program.

Given the lack of compelling evidence with regard to the efficacy of the Pell program in improving college outcomes, the federal non-Pell grant section examines whether other related federal grant programs, such as the GI Bill, yield similar discouraging effects. The empirical evidence from a variety of federal programs consistently suggests that federal grants can and have improved the access and persistence of low-income students in a variety of settings. In conjunction with findings in the Pell literature that suggest Pell grants can improve the college outcomes of some low-income students, these studies offer some hope that the Pell program can be modified to yield its desired effect more generally.

The final summary section considers what might be done to close the college enrollment and graduation gaps between low- and high-income students. The apparent unresponsiveness of dependent low-income students to Pell awards suggests that incremental adjustments to the program may not be sufficient to generate the desired improvement. Thus, the current policy debate, which has become entrenched in whether Pell awards should be funded at more-generous levels, may well miss the key point – that more significant and creative changes may be warranted in how public subsidies are provided for college. We conclude with thoughts on where the empirical literature suggests we might find fruitful means of achieving our collective objective of improving the college opportunities of needy students.

BACKGROUND

Concise History of the Pell Grant

The Pell Grant is the foundation of the federal financial aid system, providing nearly $12 billion of aid to over five million undergraduate students in FY2005. At this level, the Pell Program is the largest single source of need-based aid, serving over a fifth of all matriculating undergraduates annually. While its size alone might suggest the tendency for Pell resources to leak into higher-income populations, the vast majority of Pell recipients are found in low-income families. For example, recent estimates suggest that over 90 percent of Pell recipients who were dependent (independent) on their parents had family incomes below $40,000 ($30,000) in FY1999.

The broad purpose of the Pell program is to facilitate the access of low-income populations to investments in higher education that may not otherwise be made. The Pell program was born out of the ferment of the 1960s when politicians and academics began to link access to higher education with the American dream of upward social mobility and, in a broader sense, a movement toward economic and social equity (Schenet, Powner, Stedman, & Shohov, 2003). The program founder, Senator Claiborne Pell from Vermont, himself indicates that the program has successfully maintained popular public support and survived the political vagaries of Washington because of the simplicity of its ideal: "Namely, that no student with talent, drive, and desire should be denied the opportunity for a postsecondary education solely because of a lack of financial resources" (in Gladieux, Astor, & Swail (1998, p. vii). From the Pell program's inception, it has been argued that *need-blind* access to higher education served the national economic interest by enabling the best and brightest to fully exploit their talents and thereby contribute all-the-more to the welfare of society at large. In a climate of anticipating large-scale social returns to such investments, it followed that both taxpayers and politicians had interest in supporting basic access to higher education.

While the social turbulence of the 1960s may have been the impetus behind the Pell program, the groundwork for broad-based aid programs is more appropriately attributed to the GI Bill. In particular, the generous coverage of direct educational expenditures by the GI Bill, along with its living allowance, was broadly viewed as fostering the rapid integration of veterans into the middle class and facilitating the rapid economic growth of the post-war period. Thus,

Oregon-Senator Wayne Morse, who chaired the Senate Education Subcommittee over most of the 1960s until succeeded by Senator Pell in 1969, pushed for a federal grant program for all students. Concurrently, the "war on poverty" also led other government agencies to look toward higher education as the means through which the opportunities of low-income Americans would improve. For example, the Office of Economic Opportunity introduced a number of programs, such as College Work-Study, that focused on improving the access of the poor to higher education. All told, for over a decade, the political and economic climate had been moving toward embracing a coordinated federal financial aid system, which came to fruition formally in the Higher Education Act (HEA), put forward by President Johnson in 1965.

As part of its structure, the 1965 HEA included a reauthorization process that was to occur every four to six years as a means of regularly evaluating the federal government's financial role in higher education. The actual formulation and funding of the Basic Educational Opportunity Grant (BEOG) – renamed the Pell Grant in honor of Senator Pell in 1980 – was not actually put in place until the 1972 reauthorization of the HEA. In the intervening time between the 1965 HEA and its reauthorization in 1972, the shape of federal financial aid was bitterly debated between the Senate and the House. The Senate, under the leadership of Senator Pell, favored a $1,200 BEOG grant, paid directly to the student or to the student's family, that would be available for each of four years of undergraduate study. The House, following the lead of Oregon-Representative Edith Green, preferred a model that incorporated capitation grants to institutions – grants based on institutional enrollment but not expressly tied to individual students. Ultimately, the House-Senate conference committee yielded to Senate interests and largely adopted a program based on the Senate's model of aid to students. This formulation of the BEOG grant was also supported by the Nixon administration as encouraging institutions to be responsive to student interests. Formally, the Pell Grant was phased in over a four-year period, first with the full-time freshmen of the class of 1973–74 and then with each of the three subsequent classes of freshmen.

The Pell Grant had several key elements. First, the grant took the broadly Republican-supported form of a voucher awarded directly to students who could use it at the institution of their choice. Second, although some aid was to be made available to middle-income families, the award amount was to be based on financial need that targeted

the largest share of total funding dollars toward low-income families (particularly in the event of any funding shortfall). This provision was particularly well supported by Congressional Democrats. Third, though the voucher was not technically an entitlement, the grant was expressed in terms of a fixed maximum award ($1,400) that provided the aspiring college student a modicum of certainty with regard to the level of funding that would be available. Fourth, the program initially restricted the award level to no more than half the cost of attendance of the institution attended, which was intended to both facilitate choice among institutions and protect lower-cost and less-selective institutions that might not be positioned well enough in the higher-education market to command higher tuitions. Finally, the Pell Grant was introduced as a supplementary program that built upon pre-existing, institution-based aid programs that favored well-established universities with current-year aid allotments based on past allotments. In the end, the 1972 reauthorization yielded a hybrid program that reflected the various competing political and higher education interests of the day. Although a remarkable political achievement, the reauthorization nonetheless suffered from inadequate funding and a number of administrative difficulties that hampered implementation. Consequently, at the time of the next reauthorization in 1976, serious questions were raised regarding the effectiveness and future of the Pell program.

In general, the 1976 reauthorization was relatively uneventful. Under the new chairman of the House Subcommittee on Postsecondary Education, James O-Hara of Michigan, the reauthorization focused mainly on reducing the number of student loan defaults in order to ensure the participation of a sufficient number of banks in the Guaranteed Student Loan Program. With regard to the Pell Program, the major hurdle to the reauthorization process was the interests of private colleges in maintaining the half-cost provision along with the requirement that the federal institution-based programs be funded at no less than current levels before funds were provided to the Pell grant. These provisions, while clearly benefiting private universities at the expense of low-income students, were not changed until subsequent reauthorizations when it was clear that private universities would not be harmed by their removal. Thus, in the end, the HEA funding was extended through 1980 with the only substantive change to the Pell program being an increase in the maximum grant from $1,400 to $1,800.

A significant but short-lived change to the Pell program came in 1978 when congress passed the Middle Income Student Assistance

Act (MISAA), which substantially expanded access to the Pell Grant to middle-income students. The Bill was an omen of future political debate regarding federal aid programs because it brought to the forefront the tradeoff between funding low- and high-income students. The key Pell provision changed by MISAA was a reduction in the assessment rate on discretionary income used to calculate the expected family contribution. MISAA also permitted students to receive the in-school subsidy for Guaranteed Student Loans. Ultimately, the MISAA expansion of the Pell grant to the middle class subsided as the Regan Administration, through the Omnibus Budget Reconciliation Act of 1981, significantly cut funding to federal student aid programs and re-established low-income families as the target group for aid. Nonetheless, the MISAA made many of the political actors aware of the existing battle lines over which subsequent skirmishes would erupt (e.g., the increased use of tax breaks for college costs and merit-based aid that provided benefits to higher-income students).

The 1980 reauthorization highlighted the growing recognition that federal aid might differentially flow to students attending particular types of institutions. Given the student-based assignments of aid, it was student choice that dictated the ultimate flow of resources to two-year versus four-year or public versus private institutions. In consequence, there was a concerted effort by the chairman of the House Subcommittee on Postsecondary Education, Michigan-Representative William Ford, to broker a deal across competing interests within higher-educational markets that managed the distribution of federal dollars across these various sub-markets. Two key attributes of the Pell program that determined the flow of federal aid were the maximum award value and the half-cost rule. William Ford proposed that the major higher education associations negotiate an agreement that would acceptably modify these two provisions. The reauthorization therefore reflected the principles established in these talks. Specifically, the legislation called for a regular (and significant) increase in the maximum Pell award that was directly linked to the progressive elimination of the half-cost rule. As a result, the maximum award has increased since the 1980 reauthorization, albeit in fits and starts, and the half-cost rule was changed to 60 percent in 1986 and eliminated entirely in 1992.

Congress began the 1986 reauthorization process by writing into law the formulas for determining the expected family contribution for Pell grants. The formalization of the process was the direct result of the continued struggle between the Executive Branch, with the desire

to maintain the focus of federal aid on low-income students, and the Legislative Branch, with the desire to expand the program to middle-income students. In 1981, the Omnibus Budget Reconciliation Act significantly reduced funding for federal student aid. In response, the Department of Education (DOE) proposed a significant increase in the discretionary income families were expected to contribute toward their college expenses. In fact, the proposed increase was so sizeable that it would have eliminated Pell grants to families with incomes greater that $15,000. Through a legislative veto, Congress rejected these proposed changes and, further, provided guidelines to the DOE for writing new regulations for FY1982. However, in 1983, the Supreme Court ruled that the legislative veto was unconstitutional, thereby preventing Congress from indirectly regulating the Pell grant. As a consequence, Congress instead wrested control of federal aid and the Pell Program from the Executive Branch by directly defining the rules that determined the level of student awards. Funding for federal student aid has largely been in the hands of Congress since the 1986 reauthorization.

The important events that characterize the 1992 reauthorization have more to do with what did not change than with what did change in regards to Pell funding. In particular, note that the Pell program is unlike an entitlement program in that the reauthorization process establishes expected funding levels that are subject to the annual budget and appropriations process and that the annual Pell funding is based on DOE estimates of the number of eligible persons and the expected size of their benefits. Thus, to ensure that students who qualify for a grant receive a grant, the appropriated maximum award is frequently reduced from its authorized level reflecting the limits placed on the program by the actual annual appropriations made by Congress. In fact, at the time of the 1992 reauthorization, the appropriated maximum had not equaled the authorized maximum for more than a decade. It followed that the Pell Program was viewed as *discretionary* because it permitted less than the full funding to meet all student *entitlements*. However, the 1992 reauthorization debate considered seriously the proposal that the Pell program be made a true entitlement, partly in response to the growing relative importance of loans versus grants in the financial aid package.

Of course, the real purchasing power of the Pell grant had declined by nearly a third over the 20 years since the introduction of the Pell program which, combined with the rapid increase in tuitions, had led to the maximum Pell covering an increasingly small share of the

cost of attending college. In particular, student loan defaults were up significantly in the 1980s and some in Congress felt that making Pell grants entitlements (which would reduce the level of borrowing) might stem the tide.

While both the House and the Senate entertained bills with provisions to make Pell grants an entitlement, Congress as a whole was not willing to make such a commitment. Thus, in the end, the Pell Grant was reauthorized for six years, with annual increases in the authorized maximum award but not with the substantive entitlement change first contemplated. The 1992 reauthorization did eliminate the 60-percent-of-cost cap on award values, removed mortgage costs from the calculation of family contribution, and adopted rules that made it more difficult for independent and non-traditional students to receive Pell support, which, as we will discuss, has been shown to significantly impact students and institutions.

Other than some relatively minor adjustments to the formulae that expanded the Pell eligibility for protected classes such as working dependents and independent students without children, the 1998 reauthorization offered relatively modest changes to the program. The authorized maximum Pell award was maintained at $4,500 for FY1999, but raised by $300 in successive years, reaching $5,800 in FY2003. The appropriated maximum awards, having been largely ignored in earlier reauthorizations, increased after 1998, reflecting the increased willingness of Congress to fund student aid. At the same time, the total number of Pell-eligible students increased, which was driven largely by the growth in the number of high school graduates. The joint effect of the increase in the appropriated maximum and the number of Pell-eligible students nearly doubled the appropriations for the Pell Program over the reauthorization period – from $5.9 billion in FY1997 to $11.4 billion in FY2003.

The current reauthorization process has made it out of committee in both the House and the Senate, and again side steps some of the more controversial issues, including a renewed effort to make the Pell program an entitlement. The current House plan has proposed to *front load* Pell benefits by allocating an additional $1000 in Pell Grants for the first two years of college. As an alternative, the Senate plan creates two new grant programs that are expected to provide $8 billion in additional aid to Pell-eligible students over five years, with $2.25 billion allocated to low-income students who major in areas deemed critical to national security (i.e., mathematics, sciences, and foreign language). This most recent reauthorization process has generally focused on

the flexibility of federal financial aid to serve an increasingly hetero-geneous student population. For example, with regard to the Pell Program, both the House and Senate proposals allow Pell recipients to use their awards year round, as opposed to the 9 month restriction placed on current benefits. Nonetheless, the House and Senate plans largely stick to the traditional mechanism of raising the maximum Pell award and only modestly altering the administration of the Pell Program.

PROGRAM FUNDING: SO HOW MUCH IS THIS GOING TO COST US?

A historically significant limitation on the Pell Program's ability to serve low income students has been a disconnect between the reauthorization process and the actual federal funding for the program. The funding for the Pell program, although shaped by the guidelines laid out in the reauthorization process for a predetermined number of years (generally six to seven years), is specifically determined by annual appropriations legislation that also sets the maximum Pell Grant to be awarded (i.e., the appropriated maximum grant). The appropriated funds are available for two fiscal years starting in October of the fiscal year when the appropriation is made through September of the following year. Thus, for example, legislation was passed on February 20, 2003 that made the appropriation for FY2003 available to serve obligations through September 30th, 2004. On the other hand, the Pell Grant award year runs from July 1st (2003) to June 30th (2004). Thus, it follows that the periods of availability for the appropriated funds overlap multiple award years.

Beyond budget-related timing issues, funding problems also arise because the annual appropriation level and the maximum grant are determined well in advance of the award year they are intended to support. In particular, funding the Pell program is complicated by the difficulty in predicting the program's costs that depend on estimates of both the number of eligible students and the level of aid for which these recipients are entitled, given program rules and the maximum grant. Thus, in practice, it is necessary to predict program costs for the federal budget and then reconcile the annual program costs in a future budget (St. John & Byce, 1982). Consequently, program costs have been indirectly controlled through restricting the appropriated maximum set by annual Pell legislation, which limits the actual award

value to be less than the authorized maximum determined by the reauthorization process.

In practice, the restrictions placed on Pell funding by the appropriations process has meant that the appropriated maximum rarely equals the authorized maximum. Thus, as Figure 6.1 shows, the appropriated maximum has equaled the appropriated maximum in only three years of its history and last occurred in 1979. The appropriated maximum is the amount that the neediest students are likely to receive and is often used as a measure of the generosity of the Pell program. Consequently, there are often heated debates during the appropriation process regarding the setting of the maximum award. Nonetheless, the gap between the appropriated and authorized maximum grant grew through the mid-1990s, with only a small abatement of this trend with the 1998 reauthorization.

The logic behind enacting education appropriations at least nine months in advance of the relevant academic year is so that students can plan for college with some reasonable expectation regarding the level of financial aid that will be available to them. However, because the annual appropriation is determined on the basis of estimates of the programs costs that are expected to occur at the chosen maximum grant, it has not been too uncommon that there is either a surplus or a shortfall of funds to pay students the award value for which they qualify. A surplus is a potential problem for the DOE because it has relatively limited carryover authority. Nonetheless, shortfalls have been

Figure 6.1: Authorized and Actual Maximum Pell Grant.
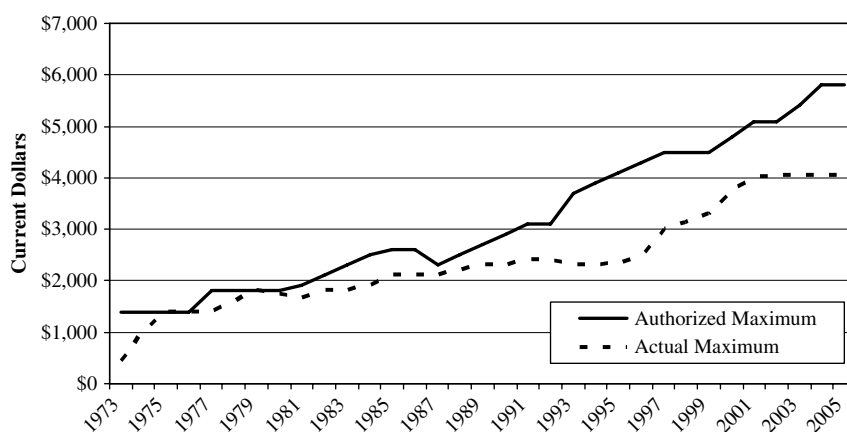
Source: College Board, *Trends in Student Aid 2004*, Table 8.

the more common occurrence, particularly in recent years. The recent response of the DOE to these shortfalls has been of particular policy concern.

Prior to the 1992 HEA, the Secretary of Education had the statutory authority to reduce awards to respond to a shortfall in appropriated funds. A reduction of awards was made eight times between 1973 and the last reduction in 1991. Although the 1992 HEA repealed the Secretary of Education's authority to reduce awards, the appropriations legislation between 1994 and 2001 technically restored this authority (although it was never used). Moreover, since 2002, the appropriation legislation has not included the authority to lower grants. Instead, the Secretary of Education has utilized the relatively unique attribute of the Pell grant appropriation to cover the shortfall: the DOE can and has borrowed from next year's appropriation because program funds are available for obligation immediately upon enactment and remain available for a full two years. In other words, the DOE uses funds from the 2nd (overlapping) fiscal years' appropriation to meet the current award year costs.

According to a 2004 Congressional Research Service report (Congressional Research Service [CRS] Report RL 31668, CRS-11), the shortfall problem began in FY2001, when under-funding led to the borrowing of almost $1 billion in future funds. Specifically, appropriations legislation for FY2001 set the maximum Pell Grant at $3,750 and appropriated $8.756 billion. In January of 2001, the DOE estimated that the program costs for FY2001 at the specified maximum grant level would be $9.115 billion, and that the difference between the appropriation and the program costs would be made up by the $359 million in surplus funds from the prior year. However, the actual program costs were $9.998 billion (a 10 percent higher program cost), while the surplus from the prior year was $40 million less than had been estimated. Consequently, there was a $923 million shortfall for the FY 2001 Pell Grant program and the DOE funded the shortfall by borrowing from FY2002 appropriation, which became available for obligation during the 2001–2002 award year.

These shortfalls have continued to accumulate, and the budget shortfall had reached $4.3 billion as of 2005. The DOE attributes these shortfalls to the recent growth in the maximum appropriated Pell Grant and the unexpected growth in the number of Pell applicants and recipients (U.S. Department of Education, 2004). Regardless, the combined effect of the Pell program changes brought about by the reauthorization process and the increasing demand pressure for Pell

funds have had a dramatic impact on who received Pell aid and the level of funding provided to Pell recipients, which is the topic we turn to next.[1]

THE PELL AWARD: WHO QUALIFIES AND FOR HOW MUCH?

All information needed to determine a student's eligibility, and the size of any Pell grant to be awarded, is provided to financial aid administrators through the completion and submission of a Free Application for Federal Student Aid (FAFSA) form, which can be submitted as early as the first of January of the year preceding projected enrollment. While there is no formal application deadline for the FAFSA, there are a number of states that impose their own deadline, some as early as the first of March. Likewise, many institutions impose their own deadline to submit the FAFSA to better facilitate the determination of their own financial aid offers.

Beyond broad-based requirements (e.g., qualified to enroll in postsecondary education, working toward a degree in an eligible program, U.S. citizen or eligible non-citizen, maintain satisfactory academic progress once in school, and no major convictions for the selling or possessing of illegal drugs), the Pell Grant further limits eligibility to students with the greatest amount of need. Although there are some exceptions, Pell recipients must have a high-school diploma (or equivalent) and be enrolled at an eligible institution as an undergraduate with the purpose of obtaining a degree or certificate. Pell funds, although available for the completion of more than one vocational/certificate or non-degree program, cannot be received by persons who have already earned a baccalaureate or professional degree. By design, then, the Pell program is not intended to facilitate retraining associated with career changes, for example. Formally, the eligibility requirements for federal student aid are contained in Title IV of the HEA.

To determine the level of the Pell grant, FAFSA-reported data are used to calculate two key measures: a cost of attendance (COA)

[1] Fiscal pressures affect other sources of federal, state, and institutional aid beyond Pell awards. Thus, although only briefly explored here, it is important to emphasize that broad-based budgeting issues are important for understanding the conclusions of the research with regard to the efficacy of the Pell program, because frequently changes in Pell awards are taking place in the context of broader changes in funding for financial aid that might well confound its effects (St. John, 2003). For example, the Social Security Benefits program that provided grant aid to college students whose parents died or experienced a disability was eliminated in the early 1980s at the same time that there were significant changes in the Pell program (Dynarski, 2002).

(which varies across both institutions and students) and an expected family contribution (EFC) (which varies across students). The COA is a measure of the expected educational expenses a student will undertake. Individual institutions set the COA for a given student, based on the attributes of the institution and the student. For full-time students, their COA includes such costs as tuition and fees, books, supplies, transportation, other personal education related expenses, and room and board. For part-time students and those enrolled in correspondence courses COA expenses are more limited.

Determination of a student's EFC is much more complex an undertaking. In general, the EFC is constructed to represent the amount the applicant-student and/or family can be expected to contribute toward financing the degree being sought. The student's contribution is estimated from information regarding their income, allowances against their income, number of children and their assets. However, the formula differs depending on whether the student is dependent, independent without dependents other than their spouse, or independent with dependents. To qualify as an independent student, and thus not have contribution from their parents be counted in their EFC, a person must meet one of the following criteria: be 23 years of age, a veteran of the U.S. Armed Forces, working on a master's or doctorate degree, married, being or having been a ward of the court, or having legal dependents other than a spouse. For dependent applicants, parental contributions are calculated over the same attributes, the value of which being divided by the number of dependents the parent's currently have in college. For independent students, there is no parent's contribution.

The EFC calculation includes a few *exceptions* in its formula. For example, a student can qualify to have their EFC calculated through a simplified formula, one which does not take assets into account. To qualify, they (for an independent student) or their parents (for dependent) must have an income below $49,999 and be eligible to file the IRS 1040A or 1040EZ tax form. Further, students may automatically qualify for an EFC of zero if their (for independent) or their parent's (for dependent) adjusted gross income was less than $15,000 the previous year and they are eligible to file the IRS 1040A or 1040EZ tax form.

Once the COA and EFC have been calculated, the value of the Pell award is formulaic. At present, conditional on being above the federally-mandated minimum grant (currently $400), the level of an individual student's grant in a given year is the minimum of: (a)

the difference between the Federal maximum Pell Grant and the student's EFC; (b) the difference between the institution's COA and the student's EFC; and, (c) the tuition sensitivity amount.[2] Figure 6.2 illustrates the relationship between a student's COA and the level of their Pell grant since the 1992 HEA assuming a student has an EFC of 0. A student's Pell award is equal to their COA as long as the COA is less than the Federal Maximum Pell award. At institutions with higher costs of attendance (i.e., above $MaxPell_t$), the binding constraint on maximum Pell grants is merely the federal maximum. Positive EFCs reduce the Pell award dollar-for-dollar, as would be illustrated by a downshift of the line *abc* in Figure 6.2 equal to the EFC.

The majority of Pell awards, over 98 percent in the 2002–2003 award year, are constrained by one of the first two constraints, as illustrated in Figure 6.2. In fact, the tuition sensitivity amount is only applicable for the poorest students who are attending institutions

Figure 6.2: The Relationship Between the Institutional Cost of Attendance and an Individual's Maximum Pell Grant.
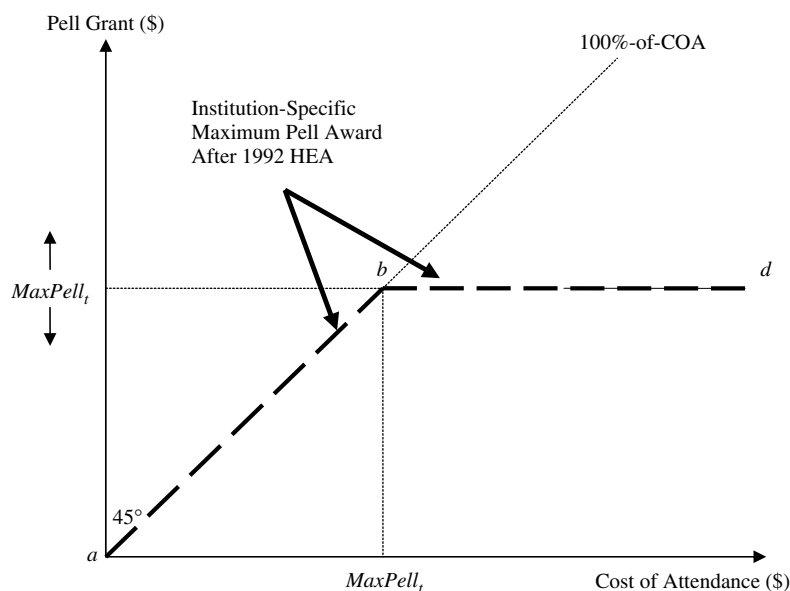

[2] The tuition sensitivity amount, which only applies if the appropriated maximum Pell grant is greater than $2,700, is calculated as $2,700 plus one-half the difference between the appropriated maximum and $2,700 plus the lesser of (a) the remaining one-half difference or (b) tuition.

01 with very low tuition levels. Thus, in 2006, a student would have
02 had to face tuition of less than $675 for the tuition sensitivity amount
03 to the binding factor in their Pell award.
04   The original intent of the Pell Grant program was to provide an
05 award that, when combined with other sources of aid and a reasonable
06 family or student contribution, covered no less than 75% of the
07 student's cost of attendance. However, while the average nominal award
08 value has increased from $270 when the program started in 1973 to
09 $2,466 in 2004, the real value of the Pell grant has decreased. In fact,
10 in real dollars, the average Pell peaked shortly after the program's
11 introduction – in 1975 at $2,602. Figure 6.3 reports the time series of
12 2005-dollar Pell awards since the inception of the program in 1973,
13 illustrating the decline in the average award value to $1,718 in 1981,
14 rising again to $2,550 in 2004.
15   Of course, in relation to the costs of college, inflation-adjusted
16 Pell awards still overstate their purchasing power over this time series
17 (particularly in recent years). In fact, the cost of college has increased
18 at nominal rates of between 5 and 8 percent since the 1980s, which
19 has outpaced both the growth in award values and the overall rate of
20 inflation, more generally. Figure 6.4 show a particularly strong trend
21 for four-year public institutions, where the average cost of attendance in

Figure 6.3: Maximum, Average, and Minimum Pell Award Values.
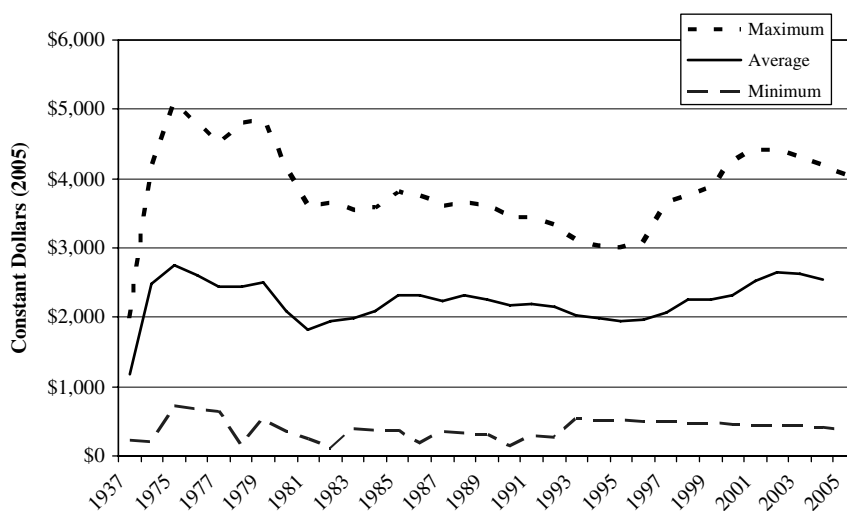
Source: U.S. Department of Education, *2003–2004 Title IV/Federal Pell grant Program End-of-Year Report*, Table 1.

**Figure 6.4**: Cost of Attendance at Public four-year and two-year Institutions.
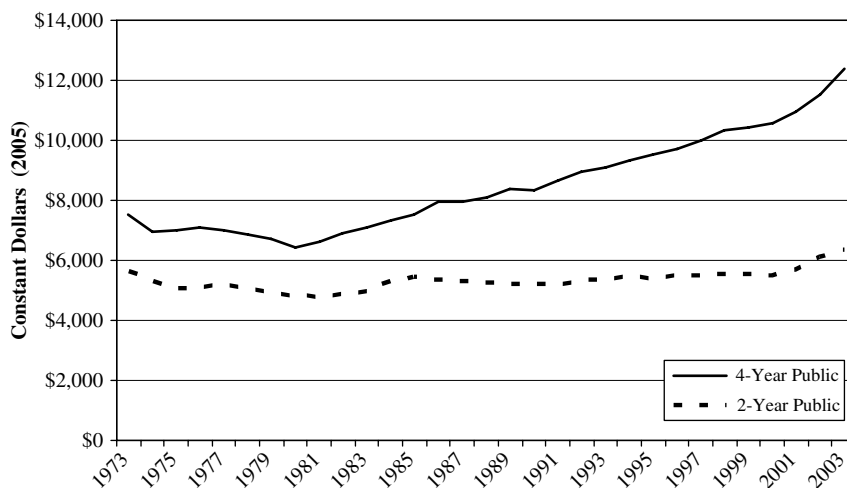
2003 was nearly 93 percent higher (in 2005 dollars) than in 1981 (when costs were at their minimum). Figure 6.4 also indicates that the trend in real costs of attending two-year public institutions, although positive, is less pronounced than at four-year institutions with an increase in real costs of about 24 percent over this same period.

Figure 6.5 illustrates the changing purchasing power of an average Pell grant as a percentage of the cost of attendance at four-year and two-year public institutions of higher education. The plots show that, at its height of purchasing power in 1975, the average Pell award covered 39 percent of the cost of a four-year public university and 55 percent of a two-year public college. In 1995, the maximum award hit its lowest point, covering only 20 percent of the average cost of a four-year public university and 36 percent of the average cost of a two-year public college.

The descriptive evidence shows that there have been significant changes in the value of the Pell program over the last 30 years, which have resulted from both explicit changes in the parameters of the Pell formula and due to intermittent interest by Congress in funding the Pell program. This variation in the real value of the Pell award has been exploited in the empirical literature to evaluate whether changes in the generosity of the program do, in fact, influence the college outcomes low-income students.

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Figure 6.5: The Average Pell Grant as a Percentage of the Average Cost of Attendance.
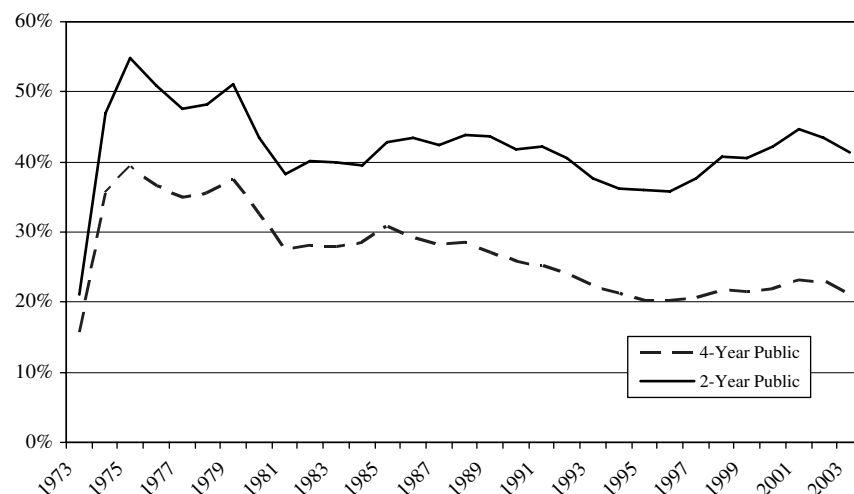
Sources: U.S. Department of Education, *2003–2004 Title IV/Federal Pell grant Program End-of-Year Report*, and National Center for Education Statistics, U.S. Department of Education, *Digest of Education Statistics*, 2004.

EMPIRICAL ANALYSIS OF THE PELL PROGRAM

### NATURAL EXPERIMENTS: TESTING THE EFFICACY OF THE PELL PROGRAM

With the introduction of federal aid to students in 1973, the earliest analyses in higher education were motivated in an attempt to quantify simple student choice models which predicted that financial aid should affect both student access and enrollment choice. For example, Jackson (1978) posits that the college-entry decision depends on both sociological factors such as family background, high-school peers, and the desire to interact with similar persons and economic factors such as the investment (human capital) and consumption value of college. Such a framework suggests that empirical analyses can potentially identify both the predisposition of students to attend college and how financial aid affects college attendance controlling for this predisposition. However, the expectation that college outcomes depend on a relatively complex set of student attributes suggests that empirically testing the efficacy of the Pell program is not straightforward. In particular, Pell awards – that by design are provided to a select

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01 set of low-income students – are likely to be correlated with omitted
02 (unobserved) student attributes that directly affect college choice.

03   The potential bias arising from student heterogeneity on the
04 predicted impact of aid on college outcomes can be demonstrated by a
05 simple empirical exercise. Specifically, we use data detailed in Singell
06 and Stater (2006) for freshman applicants to three large public univer-
07 sities (i.e., Indiana University, University of Colorado, and University
08 of Oregon) to estimate a probit model of enrollment on need-based
09 aid alone (i.e., the unconditioned need-based aid effect) and a probit
10 model of enrollment on need-based aid conditioned on a detailed list of
11 individual and institutional controls (i.e., the conditioned need-based
12 aid effect).[3] The predicted probability of enrolling in one of the three
13 universities is plotted in Figure 6.6 , which maps the unconditioned
14 and conditioned effect of need-based aid.

15   The unconditioned aid effect shows a downward-sloping
16 relationship between the amount of need-based aid and the probability
17 of enrollment, suggesting that increases in need based aid actually
18 reduce the likelihood of student enrollment. However, the conditioned
19 relationship between need-based aid and the probability of enrollment

Figure 6.6: Relationship between Probability of Enrolling and Need-Based Aid.
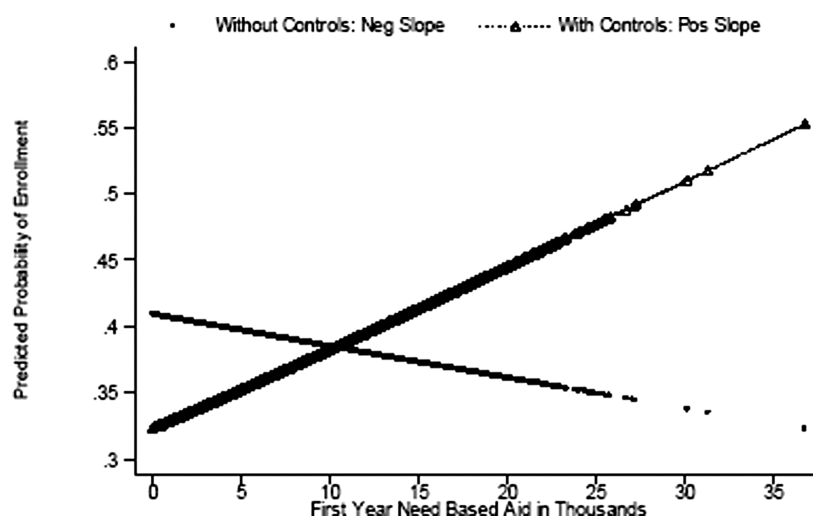
[3] The control variables include a list of personal attributes (e.g., age, gender, race, high-school
GPA) and a set institutional dummies. For a full list of controls, see Table 2 in Singell and Stater
(2006).

exhibits a positive relationship, which indicates that students who receive relatively large amounts of need-based aid have other attributes that make them less likely to enroll than the typical enrollee. In other words, a failure to control for these attributes can yield a downward bias on the impact of need-based aid. For example, there need be only one covariate that relates negatively to one's propensity to enroll and positively to one's propensity to receive need-based aid (e.g., family income) in order that omitting such a variable bias the observed relationship between aid and enrollment so much so that it yields the misleading conclusion that aid lowers one's enrollment probability.

However, just as inadequate controls for observable attributes may taint estimates of the effects of different types of aid, failure to account for the influence of unobservable attributes may have similarly undesirable effects. For instance, although it is possible to control for the relatively low socio-economic status of Pell recipients, these students may yet have some difficult-to-measure attributes (e.g., having a low personal taste for higher education or originating from backgrounds without highly developed academic support networks) that make them less likely to enroll or graduate than students who do not receive a Pell award.

The estimated effects of financial aid can be biased when an empirical analysis fails to control for unobserved attributes related to a student's likelihood of enrollment or graduation. In a critique of the techniques of the National Center for Educational Statistics, Heller (2004) documents how a failure to model unobserved attributes may understate the importance of a student's financial attributes in their college-going decisions. In the same volume, Becker (2004) goes further in the critique of education literature and outlines the various biases that arise through omitted variable bias and sample selection, which could confound the identification of the "true effects" of financial aid. To obtain unbiased estimates of the effect of Pell aid, one must find a source of exogenous variation in aid that is uncorrelated with unobserved student attributes that affect educational outcomes.

The concern with regard to identifying exogenous variation in aid has lead to a wider embrace of experimental methods into the field and study of economics. Laboratories now provide a proving ground for controlled experimentation with economic incentives. For example, the laboratory often makes economic incentives observable, where they may not be outside of the laboratory, and provides the researcher greater control over economic variables of interest. As such, those particular variables that theory may relate to behavior are both observable and able to be controlled by the researcher within laboratory environments.

In many cases, this ability to control the initial event to which theory predicts a response becomes an important element in achieving a legitimate test of the theory. Further, without the knowledge (or, more weakly, the assumption) that the event was not due to the behavior of agents, associating any observed change in behavior to the event in a causal way would be in err.

For example, consider the economist's standard model of demand and supply, where quantities demanded by consumers are believed to fall with price while quantities supplied by firms are believed to rise. The quantity demanded at a given price is also thought to respond to economic factors, such as it would to a new advertising campaign, for example. Likewise, the quantity supplied to a market at a given price also responds to economic factors. Even in such a simple model, measuring the responsiveness of consumers to a change in price becomes a non-trivial task, as the researcher must isolate the effect of changes in price on sales, holding constant other factors that can influence the level of demand. As a price change can occur precisely because of a change in one of the factors affecting the level of demand (e.g., advertising), it becomes difficult to assure that observed price changes are occurring independently.

What is a natural experiment? Arguably, the fundamental advantage offered through the advent of experimental methods in economics is the ability to better isolate a change in prices and therefore incentives. However, while the laboratory will often provide a cleaner environment, such isolation need not be absent from the world beyond the lab. Natural experiments, then, can offer the same ability for the researcher to test theory or measure behavioral responses to events. In a natural experiment, with the event which one is interested in measuring, a response occurs as a natural product of the economic system more generally. Outside of the particular period of analysis, the economic system driving the laboratory environment is specifically designed by the researcher. Therefore, while the laboratory researcher knows that the event of interest is exogenous to the economic agents under analysis (because he instigated it himself as part of the experimental design), the exploitation of naturally occurring events (such as the introduction of the Pell Grant) must be assumed by the researcher to be exogenous to the economic agents under analysis. Often times, evidence will suggest this as the case, making such an assumption quite reasonable. Given our particular interest in the efficacy of the Pell program, researchers must assume that the particular change in policy to which the response of economic agents is to be measured arose in a way that is exogenous to the economics agents themselves.

It is important to note that the comfort-level of researchers differs in regards to their wiliness to assume that government actions are independent of the behavior of the agents affected by the policy change. For example, one would naturally be more inclined to question the cause of a policy change at a particular institution (e.g., the introduction of a merit-based scholarship at Agnes Scott College) than if the policy change were to apply to a larger sample of institutions (e.g., all Georgia institutions). More germane to our point, one may question whether the behavior thought to be in response to the policy change (e.g., a stronger entering class) was actually caused by something else altogether – something that may have also caused the introduction of the merit-aid in the first place and therefore would spuriously assign some degree of predictive power to the introduction of merit aid. In general, by appealing to scale, one tends to be more comfortable arguing that the event be treated as exogenous to the economic agents under analysis as the size of the affected group becomes larger.

Of course, having the policy applied very broadly also comes at some cost. For example, testing for the efficacy of the naturally occurring introduction of the Pell Grant in 1973 is facilitated by the discriminating nature of the award. That is, by excluding certain observable types of students (e.g., the wealthy), such a group of students can act as a control group against which one might measure the effect of providing low-income students with financial assistance. It is a necessary assumption then (made either with support or not) that the control group is appropriate for such a role. Such analyses are commonly referred to as difference-in-difference. That is, when an isolated change occurs in one aspect of the economic environment, one can measure the difference in the behavioral changes within two distinct groups of economic agents before and after the change. Thus, the best studies of need-based grants are often those that exploit the unique attributes of the authorization process for the Pell program (e.g., changes in the maximum award) that can be argued are exogenous to the student and his or her home institution.

IDENTIFYING THE ENROLLMENT EFFECT OF PELL PROGRAM

The understanding that college outcomes depend on personal attributes, ability, family background, and a host of other factors led early Pell studies to use large national surveys that included a relatively high level of individual detail. In particular, early work utilized three nationally representative surveys – the National Longitudinal Study of the High School Class of 1972 (NLS72), the High School and Beyond survey of 1980

01 (HSB80), and the Current Population Surveys (CPS). These data offered
02 the advantage of including detailed individual-level characteristics for a
03 large number of potential college students at a variety of income levels.
04 However, they also contained the distinct disadvantage that the infor-
05 mation regarding financial aid was limited. In particular, the Pell Grant
06 was not identified separately from other less-generous sources of financial
07 aid and information on financial aid offers was only available for students
08 that applied for college. For this reason, these early studies were generally
09 not able to identify separate effects of the Pell program from other sources
10 of aid and could not assess the effect of financial aid on the decision to
11 apply for college that relate to the aspirations of potential college students.
12 It follows that the findings from these early studies are likely to yield a
13 biased assessment of the potential effect of the Pell program on college-
14 going behavior.

15 Jackson (1978) uses data from the NLS72 to test whether the first
16 high school classes eligible for the Pell Grant have different college-
17 going behavior as opposed to those classes prior to the Pell program.
18 He finds that the availability of Pell awards, while having no significant
19 effect on college attendance, did alter the choice of college. Specifically,
20 conditional on applying to a particular school, students who receive aid
21 are more likely to enroll at that school than similar students who do
22 not receive aid offers. In an attempt to control for the shortcomings
23 of cross-sectional analysis, Jackson (1988) merges the NLS72 and the
24 HSB80 in order to control variation across time as well as students.
25 While throughout his sample both the percentage of students receiving
26 financial aid as well as the award values themselves increased substan-
27 tially, financial aid was found to have a consistently small role in influ-
28 encing the college-going behavior of youth. Specifically, the results
29 indicate that high school graduates who are awarded financial aid are
30 roughly 7 percentage points more likely to attend college when compared
31 with students without financial aid offers.

32 Hansen (1983) and Manski and Wise (1983) also exploit the
33 increased generosity of financial aid brought about by the introduction
34 of the Pell program in 1973. In particular, Hansen (1983) hypothesized
35 that if the Pell program improved access to college then: (1) the relative
36 enrollment rates of the poor should increase after the introduction of
37 the Pell program, and; (2) the number of students planning to enroll in
38 college should increase as Pell funds become available. Two data sources
39 were used to test these hypotheses. First, CPS data were used for the two
40 years prior to the Pell program, 1971 and 1972, and for years 1978 and
41 1979, when the Pell program had become well established, which allowed

for the calculation of the ratio of below-median-income enrollment rates to above-median-income enrollment rates. This descriptive analysis indicated that this ratio of enrollment rates actually decreased over this period for each of four population groups (i.e., men, women, white and black).

Second, the NLS72 data include the percentage of high school seniors that were expected to enroll in some form of postsecondary education by socioeconomic status between 1972 and 1980. A descriptive summary of the college-attendance expectations in the NLS72 indicated that the expected enrollment rate of below-median-income students declined relative to the above-median-income group between 1972 and 1980 for white college students. This ratio increased slightly for blacks. Collectively, these findings provide suggestive evidence that the introduction of the Pell program and the availability of federal aid did little to increase the access to higher education for the poor.

However, by failing to control for other factors that affect the choice to attend college that potentially vary by income (e.g., the unemployment rate, the return to education), the analysis may simply indicate that federal aid was not sufficient to offset other factors. Moreover, Hansen (1983) also concedes that lack of support for Pell improving access may result from the value of the Pell award being insufficient to overcome the liquidity constraints facing lower-income students. At the same time, the impact of Pell was likely blunted by changes in the program over the period that permitted middle- and upper-income students greater access to federal aid. Moreover, St. John (2003) also notes that the Pell grant replaced other federal grant programs such that percentage of total federal aid distributed as grants declined over the period from 55 to 47 percent. Thus, the decline in low-income enrollment found by Hansen might simply reflect that the Pell funds might have better been spent on other grant programs.

Manski and Wise (1983) exploit the dynamics of Pell generosity generated by the authorization process. In particular, in the late 1970s the Pell program expanded beyond its original intent to exclusively service low-income students such that middle- and high-income students received a growing proportion of awards by the end of the decade. Expanding access to middle-income students at the expense of funding low-income students could reduce overall college access if financial aid influences the college-going behavior of low-income students and higher-income students plan to attend college regardless of their eligibility for the program. The paper develops a model of college-going behavior that is used to forecast if and how a given student admitted to a given set of colleges would react to changes in the cost of enrollment at those schools.

Specifically, data from the first wave of NLS72 are used to estimate a model of college-going behavior where a weighting procedure is used to account for the stratification of the NLS72 that over samples low-income and non-white students. This empirical model is then used to predict the distribution of postsecondary activity choice (i.e., four-year college, two-year college, vocational/technical school, or labor force) and the distribution of Pell awards in the period between 1977 and 1979 after the generosity of the Pell program had changed. By comparing the predicted distributions with their actual distributions, the analysis is able to simulate the potential impact of the program changes. The results indicate that the number of awards and the percent of the budget given to low income students dropped from 86 to 49 percent and from 90 to 60 percent, respectively. Moreover, by comparing the predicted and actual enrollment of Pell recipients, the results show that 41 percent of low-income enrollees are *induced enrollees* that would not have been predicted to attend in the absence of aid, dropping to 16 and 6 percent for middle- and high-income students, respectively.

Collectively, the evidence with regard to the efficacy of the Pell program in increasing college enrollment is relatively mixed. These finding, although perhaps surprising, are consistent with early demand studies such as Jackson and Weathersby (1975) that suggested that college students are generally insensitive to variation in the net price of college. For example, Leslie and Brinkman (1987) conduct a meta-analysis using elasticity estimates from twenty-five college demand studies. In their analysis, variation in net price depends on both the tuition price and the level of need-based or non-need-based aid. The results confirmed the theoretical expectation of a downward-sloping demand curve for college, but also indicate an inelastic price responsiveness in the range of 0.5 to 0.8 percent.[4] Thus, much of the early empirical evidence suggested that pulling students over the threshold from non-enrollment to enrollment may not be an easy task, particularly for the low-income students serviced by the Pell program.

[4] Broadly, empirical studies that have estimated student responsiveness in higher education markets report elasticities of demand that are less than one despite substantial variation in both the degree of aggregation and the time period analyzed. In particular, such is the case using time-series variation in aggregate prices and enrollments for broad sets of universities (e.g., Campbell & Siegel, 1967) or single institutions (e.g., Seneca & Taussig, 1987), individual variation in net prices and decisions to enroll for a random cross-section of college-age persons (e.g., Tierney, 1982) and for applicants to a specific university (e.g., Ehrenberg & Sherman, 1984). In addition, more recent work also finds an inelastic price response for public and private universities (i.e., Dolyle & Cicarelli, 1980; Parker & Summers, 1993), for in-state and out-of-state students at public universities (i.e., Curs & Singell, 2002), and across different racial and income groups (i.e., Blakemore & Low, 1983; Wetzel et al., 1998).

01 HETEROGENEITY IN THE ENROLLMENT IMPACT OF FEDERAL AID

02

03 More recent work has sought to examine whether the mixed evidence
04 regarding the impact of the Pell program on college access might be
05 attributed to either heterogeneity in the responsiveness to different type
06 of aid or for different subgroups of the population. Jackson (1990) uses
07 the HSB80 data to examine how different demographic groups respond
08 to financial aid. An important contribution of this paper is a distinction
09 between scholarships/grants and loans. Scholarships are found to have a
10 positive effect on college entry, while the presence of loans in a financial
11 aid package has little enrollment effect. Interestingly, the largest grant
12 effect is found for minority students, although this differential aid effect is
13 not significantly different between Hispanics and whites and disappears
14 completely when a control for the tendency to attend college is introduced
15 into the model. These findings suggest that financial issues may not be the
16 deciding factor in whether a Hispanic student chooses to go to college.[5]

17 Following Jackson's model of student choice, St. John and Noell
18 (1989) investigate the impacts of various financial aid packages on the
19 enrollment of high school seniors. The analysis extends the literature
20 by focusing on the type of financial aid package offered, not just the
21 availability of aid. While evidence is found that all types of aid (grants,
22 loans and work-study) have a positive impact on college attendance, the
23 analysis does not find significant differences between the various types
24 of aid. In addition, St. John (1990a) uses the sophomore class of the HSB
25 database and finds that an increase in each type of financial aid (i.e.,
26 grants, loans, work-study) alters behavior more than a similar reduction
27 in tuition. Interestingly, grants appear to have the largest impact on the
28 lowest income group, while loans only are effective in changing behavior

29

30 [5] Studies based on individual-level data at specific institutions have found similar evidence that
minority students and students from lower socio-economic status respond differently to financial
31 aid. For example, Ehrenberg and Sherman (1984) model how financial aid can be used to obtain
32 the optimal mix of students in a selective university (Cornell University) that faces a larger number
of applicants than it has capacity. They find that the enrollment yield from aid is significantly
33 lower for minority and low-income students. In addition, individual-level, institution specific
34 studies have also continued the disaggregation of the aid package into its separate components.
35 For example, exploiting variation at a large public university (University of Oregon), Singell and
Stone (2002) find that enrollment responses not only differ between increases in tuition versus
36 aid, but that merit-based aid has a larger impact than need-based aid. Moreover, less generous
37 forms of need-based aid (e.g., unsubsidized loans) have a larger enrollment impact than more
38 generous forms of need-based aid (e.g., grants or subsidized loans). In addition, non-need-based
and merit-based aid, while improving the access of all students, is found to increase the relative
39 opportunities of well-to-do students, even with merit held constant. Thus, individual level studies
40 of college choice suggest that needy students are less responsive to financial aid both at public
41 and private universities.

for the middle class. Although this result is consistent with low-income students being relatively risk averse with regard to debt, it also suggests the potential presence of unobserved heterogeneity that is jointly correlated with need and the level and type of aid.

Thus, a number of studies have continued the tradition in the higher education literature of employing the natural experiment methodology that (at least potentially) can identify exogenous variation in aid. For example, Kane (1994) uses CPS data from 1973 through 1988 which includes time series and cross-sectional variation in public tuition levels, financial aid, family background, local economic conditions, and the returns to education to investigate the differential trends in college enrollment for 18–19 year old white and black students. Specifically, the analysis makes use of CPS information on home ownership, family income, number of siblings in college, and the employment status of the spouse and of the head to simulate for each sample member the expected Pell grant using the Pell grant rules in each year. Thus, the impact of the Pell grant is identified by nonlinearities in the Pell grant formula as well as changes in the Pell grant formula over time.

The results for the fully specified model that includes controls for state and year effects indicates that the Pell grant had no significant impact on college enrollment of black youth, but does significantly increase enrollment of white youth by approximately 9 percent for each $1000 of aid. However, an analysis comparing changes in enrollment rates for eligible and ineligible students before and after the establishment of the Pell program in 1973 yields little evidence that those targeted by the Pell program (white or black) experienced relatively greater increases in enrollment. Interestingly, the results for tuition are consistently negative and significant with generally larger magnitudes than those found for the Pell award. The differential response of students to equal offsetting changes in tuition and financial aid is a common finding in the higher education literature (e.g., Curs & Singell, 2002). Such differences might arise because there are genuine differences in the value of a dollar of tuition and a dollar of aid. For example, students may be more uncertain about the actual amount of their Pell grant eligibility than they are about the level of tuition (e.g., Orfield, 1992). Alternatively, in this instance, measurement error in the simulated Pell grant variable might also bias the impact of the estimated impact of the Pell award toward zero.

Kane (1995) extends the enrollment analysis conducted in his 1994 paper by exploiting the unique information available in three different data sources: (a) the October CPS survey from 1977 to 1993; (b) NLS

data for 1979; and (c) the High School and Beyond (HSB) survey for the senior class of 1980. However, similar to Kane (1994), an examination of the growth in enrollment rates for those from families in the lowest income quartile (generally eligible students) in comparison to those from the top three quartiles (who are increasingly unlikely to be eligible) is made using CPS data for the pre-versus post-Pell period (i.e., 1970–1972 versus 1973–1979). However, in this case, a distinction is made between any college enrollment, private college enrollment, and public two-year college enrollment. The results indicate that total (private) college enrollment grew 2.6 (2.8) percent less for the lowest income quartile over the period. On the other hand, college enrollment grew between 2.4 and 3.4 percent more quickly for the lowest income quartile at public two-year colleges. This result provides the first evidence that the Pell program may yield significantly different effects across institutions of different selectivity. In other words, student concerns that the Pell program is not sufficiently generous to provide access to more selective institutions and institutional concerns that the Pell program differentially benefits certain institutions could well be warranted.

The most dramatic change in enrollment behavior over the quarter century has been the rise in the participation of students over the age of 30 in undergraduate education, which rose from 15 to 30 percent of the total of all undergraduates between 1970 and 2000. An important question is the extent to which the availability of federal aid in general and the Pell grants in particular accounts for the greater participation of older students in higher education. Seftor and Turner (2002) explicitly examine this issue by again making use of a structural change brought about by; (1) the introduction of the Pell program and; (2) a 1986 reauthorization rule change that redefined independent student status thereby restricting this group's access to Pell funds.[6]

Two separate analyses use CPS data for the period between 1969 and 1974 that span the period of the Pell program's introduction and between 1984 and 1990 that span the period of the 1986 reauthorization. The results from the first analysis show that, unlike for the broader population of college students, the introduction of the Pell program increased the enrollment of male (female) independent students by 1.5 (1.3) percent. The relatively greater responsiveness of older, independent students versus their younger dependent counterparts suggests that older students are somewhat less daunted by the complexity of applying for federal aid or

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[6] The 1986 amendment to the Higher Education Act required, for the first time, a Pell applicant to be at least 24 years old, married, or with children to qualify as an independent student.

that credit constraints are relatively more binding on older, independent students. In addition, a second analysis suggests that narrowing the definition of an independent student reduced the probability of college enrollment by between 3.9% and 4.4% relative to single students with no children. Thus, these results again suggest that the college-going behavior of nontraditional students is responsive to the generosity of federal aid. Nonetheless, the authors are careful not to suggest that providing greater aid to this population is worthwhile from a policy perspective. Specifically, to identify the merits of public subsidies for older students requires a credible estimate of the impact of additional schooling on their earnings that is not presently available and that is likely to differ from the return to education of younger students who make a direct transition from high school to college.[7]

One concern regarding the effectiveness of need-based programs, such as the Pell grant, to influence college access has been the growing use of merit-based programs by states and institutions to attract and retain the best students. For example, McPherson and Schapiro (1998) document the declining portion of subsidized need-based aid in the total financial aid package. One prime example of these merit-programs is the Georgia HOPE scholarship that, starting in 1993, provided a full tuition subsidy to attend any public university in the state to any Georgia resident who graduate high school with a B average or better along with a generous subsidy for any private university in the state. Using data on annual Pell enrollments by institution that span the 1993-introduction of Georgia's HOPE Scholarship, Singell, Waddell and Curs (2006) documents differential responses to the generous merit scholarship based on need. Contrary to that implied by other work, they find that the number of Pell recipients increased at Georgia institutions after HOPE, when compared to other southern universities, which they argue is consistent with broad merit-based scholarship programs improving college access for needy students. However, as they also document that the average Pell award in Georgia falls after HOPE's introduction, they suggest that HOPE drew students of lesser need into the Pell program. Total Pell revenues increased in Georgia relative to other southern institutions after HOPE, which also implies that broad merit-aid programs are

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[7] Other work has examined the impact of other benefit restrictions brought about by acts of Congress. For example, Tewksbury, Erickson, and Taylor (2001) examine the enrollment impact of The Violent Crime Control and Law Enforcement Act of 1994 that precluded all prisoners in federal or state penal institutions from receiving Pell Grants. This Act furthered the restrictions instituted by the 1992 reauthorization that limited awards to incarcerated persons not under a death sentence and not serving a life sentence without the possibility of parole.

effective at leveraging scholarships with greater Federal funding paid to needy students who may have not otherwise attended college.

Collectively, the results of these more recent studies suggest that the findings in prior work that the Pell program does not yield significant broad based college enrollment effects may not necessarily apply to particular groups of students or to specific types of institutions. For example, the college access of independent students appeared to be harmed by the reduced generosity of the Pell program toward this class of students in the 1992 reauthorization (Seftor & Turner, 2002), while the Pell grant appeared to increase enrollment at two-year schools but not at four-year institutions (Kane, 1995). Thus, these studies highlight the importance of understanding how exogenous changes in federal aid programs intentionally or unintentionally target particular actors in the higher education market.

THE EFFICACY OF PELL AID ON PERSISTENCE

Beyond considerations of access to college, there is a reasonable expectation that financial aid should improve students' ability to remain in college through to graduation. However, the effects of financial aid on enrollment may well differ from its effect on graduation, especially since we know only 60 percent of enrollees at four-year public universities graduate (Singell, 2004). In general there are relatively few studies of the effect on financial aid on retention and graduation simply because there are less data detailing persistence in college than on enrollment (Hu & St. John, 2001). Moreover, graduating students are a self-selected sample of enrollees who choose to first enroll and then complete a degree at a particular school versus a number of often unobserved alternatives such as enrolling at a competing school, transferring schools, or completing a degree at a later time, which present empirical issues regarding sample selection and the correlation of aid with unobserved factors the relate to graduation. For example, a first generation college student or one with unobserved family or health issues are more likely to fail to complete federal aid applications (i.e., a FAFSA form) and graduate. Such potentially unobserved student attributes can yield a negative association between the Pell grant and graduation when, in fact, the lack of need-based aid is not the root cause of the drop-out decision but is simply inversely correlated with the unobserved attribute or negative shock that ultimately leads to the student not persisting in college. Thus, it is not surprising that studies that do not account for the self-selection of Pell students find little

or no effect of the Pell grant on the persistence of recipients in comparison to non-recipients (Wei & Horn, 2002).

Institution level studies of persistence have tried to minimize the correlation of aid with *unobservables* by including relatively detailed lists of controls for personal attributes and for different types of aid that comprise the financial aid package (i.e., loans, scholarships, grants, work-study, etc.), which are generally not available in national-level data sources (e.g., Wetzel, O'Toole, & Peterson, 1999). For example, Metz (2001) uses detailed student-level data from a two-year technical college and exploits a change in the 1992 HEA which required two-year colleges to report degree completion rates to qualify for federal aid in order to examine the impact of various components of financial aid on degree completion. The results indicate that Pell grants do not significantly influence degree completion, while loans and work-study improve degree completion. A relative small retention effect of Pell grants is not uncommon in institution-level studies (e.g., Singell & Stone, 2002).

The finding that Pell awards have relatively small (insignificant) retention effect may reflect that federal grants are perceived by students as entitlements, but may also reflect the difficulty in finding sufficiently detailed data to control for the fact that grants are systematically provided to the neediest students whose unmeasured attributes are correlated with persistence. For example, DesJardins, Ahlburg & McCall (2000a & 2002b) use detailed data on students enrolled at the University of Minnesota to estimate a hazard model, which is used to simulate how changes in financial-aid packaging affect students' departure decisions. Collectively, the simulations indicate that scholarships significantly reduce stop outs, whereas grants yield insignificant effects. However, income data are missing and excluded from the hazard model specification. Thus, if low-income students are more likely to receive a grant and to stop-out for a term to work, the impact of grants on persistence may well be biased downwards if these students eventually return and complete a degree.

In general, there is a fair amount of heterogeneity in the empirical evidence regarding the persistence effects of Pell grants. Specifically, some work finds that grants do improve persistence (e.g., Thomas, 1981; St. John, 1990b), but other analyses find insignificant (e.g., Braunstein, McGrath & Pescatrice, 2001) or even negative effects (e.g., St. John & Starkey, 1995). Moreover, there is no clear consensus with regard to the types of aid that most effectively induce higher persistence, with some articles pointing to on-campus employment (e.g., DesJardins, Ahlburg & McCall, 1999), others to merit aid (e.g., Singell, 2004) and still others

to grants (e.g., Carroll, 1987; St. John, 1990b). This lack of consistent evidence regarding the graduation effect of aid in general and Pell grants in particular may well arise from the particular importance of endogeneity in regards to the receipt of Pell awards and persistence.

Thus, similar to empirical modeling issues related to enrollment, pinpointing exogenous sources of aid variation is also important in the study of persistence. A handful of studies have sought exogenous sources of variation in support to identify the effect of aid on post-enrollment outcomes. For example, Singell (2004) uses data on applicants and enrollees to the University of Oregon to estimate a bivariate probit specification that models the retention decision jointly with the decision to enroll. The results of a univariate probit model for graduation indicate that grants do not significantly increase the retention probability. However, a bivariate-probit specification that is conditioned on both the observed attributes that relate to graduation and unobserved attributes that determine enrollment (i.e., the error structure for enrollment) indicate that a $1000 increase in grants raises the probability of remaining in school by 1.3 percent. These findings suggest that the unobserved attributes of needy students that determine the enrollment decision are inversely related to their retention probability such that there is a downward bias on the retention effect of grant aid.

Likewise, similar to studies of the impact of financial aid on access, some graduation studies have exploited changes in the aid assignment rules in the Pell program that yield different levels of support to similar students in order to identify variation in aid that is uncorrelated with the underlying propensity to graduate. The best example of this approach is Bettinger (2004), which is the only paper to directly study the affect of Pell grants on retention (as opposed to grant aid in general). The empirical analysis uses unique Ohio Board of Regents (OBR) data that permit transfer behavior of students to be tracked (at least within the state of Ohio). The OBR data provide information for all public universities in the state of Ohio for 1999 and 2000 and include detailed student demographics information along with financial information that track whether a student stops out from college as opposed to transferring to another school within the state. To isolate the exogenous variation of Pell grants independent from a students' stop-out behavior, the Pell grant is imputed for each student in the 2000–2001 school year holding constant family characteristics. The imputed Pell grants vary due solely to changes in the Pell program and tuition and also provide Pell award values for non-filers.

To examine the impact of the Pell grant on retention, the empirical analysis makes use of the discontinuity in the value of the Pell award, which arise from Pell rules regarding family size. Specifically, by assuming that the differences in family size are unrelated to a student's success in college, the analysis makes comparisons between different-sized families who have the same number of children in college. The stop-out behavior of these similar groups are compared using the Wald estimator developed by Angrist (1991), which is simply the regression of the instrumental variables estimate of stop-out behavior on size of the Pell grant. The results show that a $1000 increase in Pell grants stemming from differences in family size corresponds to a 3 to 4 percent decrease in the probability of dropping out. However, this retention effect declines in magnitude (i.e., to approximately 1.2 percent) and becomes insignificant if the sample is restricted to those students for which the ACT exam is available or if additional campus level controls are included. The decline in the magnitude of the retention effect when individual or campus-wide ability differences are included highlights the potential importance of student self-selection, which appears to be correlated with the effect of need-based grants on college outcomes.

Overall, the broad findings with regard to the persistence effects of Pell grants are decidedly mixed. A generous assessment of the efficacy of the Pell grant on retention would suggest that it improves retention by a relatively small amount – on the order of a 1 percent increase in the probably of graduation per $1000 of aid. These findings combined with the findings of a small and generally insignificant impact of the Pell grant on access imply that the cumulative impact of the Pell grant on college outcomes is at best modest.[8]

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[8] Some evidence has been found that grant aid can improve persistence. For example, Dynarski (2002), in addition to issues of access discussed above, exploits the natural experiment brought about by the elimination of the Social Security Benefits Program to study how the reduction in grant aid affects college completion. Using death of a parent to proxy for qualifying for Social Security Beneficiary status in the CPS data, she finds a $1000 increase in the offering of grant aid raises educational attainment by 0.16 years, suggesting that grants improve retention and the likelihood of clearing the graduation threshold. Consistent with the institutional level studies, the retention effect of grant aid appears to be relatively small. On the other hand, the analysis can only identify whether the individual potentially qualifies for aid and not whether the person actually receives aid. It follows that the aid results are likely to be attenuated due to measurement error, which would bias the coefficient on grant aid toward zero.

SUPPLY-SIDE EFFECTS OF PELL
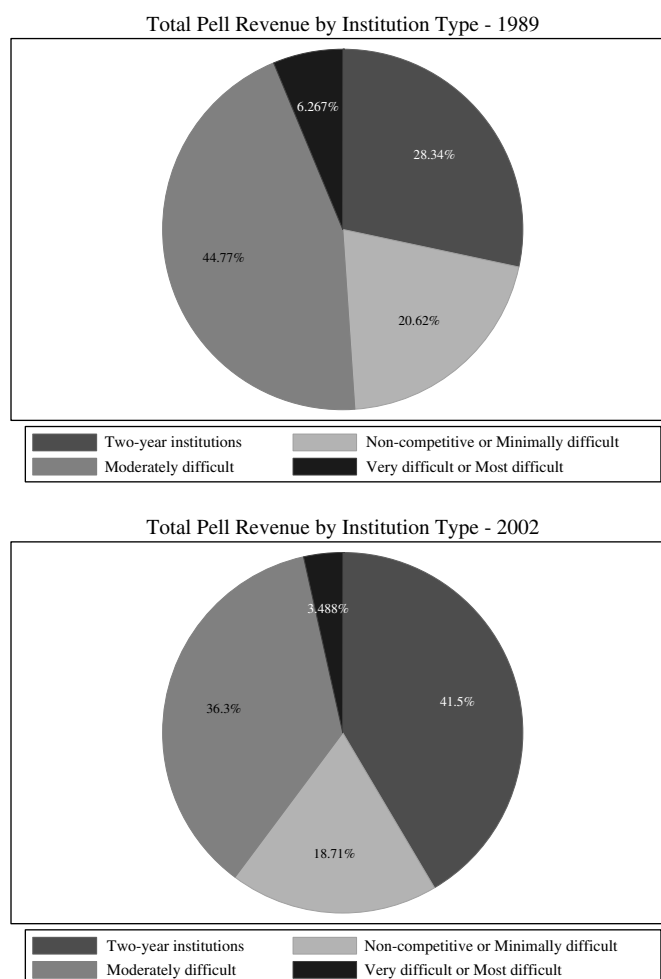
INSTITUTIONAL EFFECTS

Why does the estimated enrollment responsiveness to the Pell program appear to be so low? A common interpretation of these findings focuses on the demand side and ascribes an inelastic demand to low-income students. On the other hand, it is also unlikely that institutions sit idly by when federal aid policy changes. Thus, it is possible that supply-side responses to federal aid could be responsible for the observed overall lack of response to the Pell program. Recall that the historical design of the Pell program did not serve to exclusively promote the access interests of low-income students. For example, the half-cost rule that limited the Pell award to no more than half the cost of tuition was explicitly included in the initial authorization of the Pell program to protect less-selective, low-cost (private) institutions (i.e., limiting Pell awards kept low-income students from moving up the higher education hierarchy to more selective and expensive schools). Thus, a relevant question may be whether changes in the Pell program yield significant institutional effects.

It is easy to show that changes in the Pell program over time have greatly affected the Pell revenue earned by various institutions. Specifically, the pie charts contained in Figure 6.7 uses IPEDs and Department of Education data from Curs, Singell, and Waddell (2006) to show that there has been a significant shift in Pell resources going toward two-year institutions with the largest proportional shift in Pell revenue coming from the most selective four-year institutions.[9] While Pell revenues may not be a particularly important source of funds for resource-rich, selective private institutions that have historically serviced relatively few needy students, Pell revenue is likely to be a critical source of funds for two-year institutions and less-selective four-year universities. Thus, some institutions might have a strategic interest in attracting federal grant aid.

Thus, while a primary interest of the Pell program and U.S. aid policy was to facilitate the match of students to institutions based on ability, it is also clear that certain changes to the Pell program

[9] Figure 6.7 is constructed using unique institution-level Pell-related data from the Department of Education. The Peterson's Guide to Four-Year Colleges from 1989 is used as the institution's selectivity metric, which separates two-year institutions from four-year institutions classified as non-competitive, minimally difficult, moderately difficult, very difficult and most difficult. The sample used in Curs, Singell, and Waddell (2006) focuses on a well-defined set of colleges with a common academic mission that includes all non-profit institutions that offer at least an associates degree. Thus, for-profit and trade schools are excluded.

Figure 6.7: Distribution of Pell Revenue by Institution Type, 1989 and 2002.

Total Pell Revenue by Institution Type - 1989

6.267%

28.34%

44.77%

20.62%

| ■ Two-year institutions | □ Non-competitive or Minimally difficult |
| ▨ Moderately difficult | ■ Very difficult or Most difficult |

Total Pell Revenue by Institution Type - 2002

3.488%

36.3%

41.5%

18.71%

| ■ Two-year institutions | □ Non-competitive or Minimally difficult |
| ▨ Moderately difficult | ■ Very difficult or Most difficult |

Source: Curs, Singell and Waddell, 2006.

(e.g., the half-cost rule) might well benefit some institutions at the expense of others. Indeed, Singell (2002) shows that composition of the financial aid package depends on student attributes, institutional factors, as well as external pressures. Likewise, Turner (1998) contends that institutions with large financial aid budgets before the introduction of the Pell grant program had the capacity to undo the targeting of the federal grants. It follows that, the change in the net cost to low-income students who qualify for a Pell award might well be much smaller at well-funded universities as opposed to community colleges.

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Curs, Singell and Waddell (2006) explicitly examine whether changes in the generosity of the Pell program affect the distribution of Pell revenues across the quality spectrum of universities. In particular, they analyze how generosity correlates with institutional Pell revenues by utilizing exogenous variation in the federally-determined maximum Pell Grant and federal appropriation levels, as well as the annual variation in the total number of students who are deemed Pell eligible following the application of federally-determined criteria. Broadly, Pell revenues depend on the pool of students applying for aid and their institutional choices. Thus, they also explore how the institutional Pell-revenue response relates to changes in the average Pell award per student and enrollment at each institution, which provides some of the first formal evidence of the efficacy of the Pell program in influencing the composition and net distribution of needy students across U.S. universities.

Overall, they find significant increases in institutional Pell revenues with increased generosity. Nonetheless, the magnitude (and even the direction) of the revenue response depends on the channel (i.e., the maximum Pell value versus federal Pell funds) and the selectivity of the institution. In particular, they report that revenue data show that the fraction of Pell revenues going to two-year institutions rose from just over a quarter of the total disbursements in 1989 to over 40 percent in 2002, suggesting that Pell has expanded access at less selective institutions.

Curs, Singell, and Waddell (2006) also investigates the aggregate enrollment patterns around the 1992 Higher Education Amendments (HEA) that removed tuition-based caps on maximum Pell awards. Measured against a group of slightly higher-cost but otherwise similar institutions, they report a significant increase in the enrollment of low-income students at low-cost institutions that experienced this exogenous increase in Pell generosity. In short, results are suggestive that student enrollment does respond to aid. Further, although prior evidence suggests that Pell grants do not move students over the threshold from non-enrollment to enrollment, they find that low-income students appear sensitive to the level of aid conditioned on the decision to enroll.

THE BENNETT HYPOTHESIS

Rather than argue for greater emphasis on need-based aid, some critics have argued instead that federally subsidized aid may be part of the

problem, and have even proposed federal caps on tuition increases. Several former Secretaries of Education, beginning prominently with William Bennett, have expressed concern that increases in federal support, rather than lowering college expenses for students, are instead appropriated by universities through increases in tuition (Bennett, 1987). This view has come to be known as the Bennett hypothesis.

Even without turning to idiosyncratic organizational models of university behavior (as in Hoenack & Pierro, 1990; or Netz, 1999), one can offer three basic interpretations or explanations for the Bennett hypothesis. The simplest is provided by the standard competitive model. In this case, increases in student demand for enrollment arising from increases in financial aid are met with a relatively inelastic supply response from universities, so that increases in aid are translated into proportionately large increases in tuition. In the extreme case of perfectly inelastic supply, tuition increases by the full amount of the increased aid. This result would be counter to the intent of the Pell program, which seeks solely to increase enrollment through improved access to college. Pell grants could yield a pure enrollment effect in the case of perfectly elastic supply, in which case enrollments would increase but not tuition. With public universities, tuition may be regulated directly or indirectly by the state, possibly limiting tuition responses to enrollment pressures, at least for in-state students.

A second explanation relies on imperfect competition, possibly enabling universities to appropriate an even higher proportion of aid via tuition increases. In fact, universities are highly differentiated: public and private, exclusive and nonexclusive, liberal arts and comprehensive, large and small, close and far, and so on. In this case, the demand for enrollment at many universities is likely to be downward sloping, providing an opportunity for universities to exert market power in setting tuition and exaggerating increases in tuition beyond competitive levels. As in the competitive case, though, tuition increases at most by the full amount of the increased Pell aid. It is this explanation that appears to most closely match the rhetorical arguments of former Secretary Bennett and other critics. Indeed, there is evidence not only that presidents and provosts of public colleges and universities have a significant effect on enrollment supply (e.g., Coates & Humphreys, 2002), but also that the total compensation of presidents of private colleges and universities is related to the level of tuition, even with expenditures, type of institution, reputation rankings, and other factors held constant (Tang, Tang, & Tang, 2000).

Curs, Singell, and Waddell: *The Pell Program at Thirty Years*

A third explanation also relies on imperfect competition, but with price-discriminating behavior by universities. In this case, the Bennett hypothesis might hold if an increase in aid to needy students with relatively elastic demand induces an even greater increase in tuition for other students with relatively less elastic demand. With price discrimination, the price charged to each type of student is set, via discounts or internal scholarships, to equate marginal revenue in each case to the common marginal cost (where there are no cost differences).[10] In this case, the price increase for students with less elastic demand is *not* limited to the increased aid amount to needy students. With sufficiently steep marginal cost curves, relatively elastic demands by aid recipients, and relatively inelastic demands by other students, the increase in price for the market with relatively less elastic demand can *exceed* the increased aid amount.[11]

EMPIRICAL EVIDENCE OF THE BENNETT HYPOTHESIS

Early empirical examinations of the Bennett hypothesis are suggestive. McPherson and Shapiro (1991), Turner (1997), and Li (1999) find evidence that tuition rises for at least some segments of the higher education market with the generosity of federal aid, but the segments where effects are significant and the magnitude of the effects vary substantially across the three studies. Such inconsistencies may arise from unobserved heterogeneity among universities, which is addressed in the subsequent literature by introducing institution-specific fixed effects.

Singell and Stone (in press) estimate a tuition regression with the average Pell award per recipient as the key explanatory variable, which the Bennett hypothesis suggests should be positively related to tuition. Theory suggests that the coefficient is expected to be between zero and one, reflecting the extent to which federal aid support is passed on to the student in terms of higher tuition. However, the cost characteristics of the Pell program and the selection decisions of needy

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[10] Netz (1999) finds evidence of this kind of price discriminating behavior for need-based aid and tuition for the schools that coordinate criteria for awarding need-based aid in the Ivy Overlap Group. Internally provided need-based aid substantially increases tuition for non-needy students, as well as for students who receive financial aid.

[11] Hill and Winston (2006), for example, using data for Williams College, find remarkably similar shares of income paid for a year of college for aided students across the five income quintiles. Specifically, the shares of pretax family incomes range from 6% to 20% – the lowest income quintile paying the smallest share and those at the 95th and 99th percentiles, paying full price, spending 22% and 9% of their family incomes, respectively. Thus, there is some evidence that the best private schools do price discriminate, typically via need-blind admissions policies.

students could bias the coefficient on average Pell awards. Specifically, because the Pell grant formula uses cost of attendance to calculate a student's award, the tuition of a school may be positively correlated with the level of the Pell grant, which would yield an upward bias on the coefficient for the Pell grants. The potential bias is limited, though, because the formula only depends in part on costs, of which tuition is only a part, and the allowable tuition has been subject to various maximums in the formula, all typically well below the relevant student costs. Alternatively, Pell grant recipients may be less likely to enroll in universities where tuition is rising more rapidly than average because they are relatively needy students, which would yield a negative bias to the coefficient for Pell grants.

A concern with potential endogeneity requires the use of instru-mental variables that include both a set of binary variables that identify changes in the Pell program parameters and the lagged value of Pell grants to instrument for the current value of the average Pell.[12] Fixed-effect tuition regressions are estimated for in-state and out-of-state students at public universities and for students attending private universities using a panel of 1554 colleges and universities from 1988 to 1996 drawn primarily from the IPED data source. Hausman tests, in fact, indicate rejection of the null hypothesis of exogeneity for the average Pell grant at no less than the five percent level in each of the specifications.

The fixed-effect instrumental variable specifications indicate little evidence of the Bennett hypothesis for in-state tuition at public univer-sities, but indicate nearly a one-to-one relationship between Pell awards and out-of-state tuition and tuition charged at private univer-sities. Thus, while in-state students appear to be insulated from price responses to federal aid (perhaps because of the explicit mission of public universities to serve in-state students or because of agents such as Regents or legislators that represent them), public universities behave similarly to their private counterparts with regard to tuition charged to out-of-state students. These results suggests that intra-state political factors are particularly strong, especially since prior evidence on demand elasticities indicate that demand, if anything, is less elastic for in-state versus out-of-state students (Curs & Singell, 2002). Collec-tively, the results in Singell and Stone (in press) suggest that the pricing

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[12] The binary variables for changes in parameters of the Pell program reflect exogenous government changes in the program in particular years: the percent cost rule, which mandated the maximum percentage of tuition costs that could be covered by Pell grants, was raised from 60 to 100 percent in 1993; and budget shortfalls led the Office of Postsecondary Education to decrease the grants of all but the neediest students by a linear formula in 1990.

behavior of higher education institutions is sensitive to both political and market interests, as well as, perhaps, to individual institutional objectives with regard to access for needy students.

Accounting for the potential endogeneity of Pell aid in a tuition regression is critical to testing the Bennett hypothesis and the use of instrumental variables is sometimes more of an art than a science. Thus, no single study or empirical strategy is sufficient to establish the presence of supply-side responses to federal aid. Thus, it is important to look to other studies. For example, Rizzo and Ehrenberg (2003) empirically examine the factors that drive the price responses of public institutions to changes in financial aid and state appropriations for higher education. Their sample consists of 91 (flagship) public research institutions representing all 50 U.S. states, with data drawn from IPEDS and other sources for the period between 1990 and 1998. The empirical analysis uses a 2SLS approach to simultaneously estimate four equations explaining need-based grant aid, in-state tuition, out-of-state tuition, and the percentage of non-resident undergraduate students. The system is identified through a complex set of exclusions that include, for example, state-tax revenue per capita entering in the tuition equations and SAT scores entering in the non-resident share equation. Pooled cross-section, time series and panel estimates suggest that increased generosity of federal aid as measured by the maximum Pell award are not associated with higher in-state tuition at public universities.

Alternatively, Acosta (2001) looks at whether institutions respond to an increase in federal aid that raises student demand by either raising tuition or by substituting away from institutional financial aid. The analysis uses IPEDS data for the period between 1991 and 1996, which is merged with home equity data from the U.S. Census Bureau's American Housing Survey. Fixed-effect tuition and institutional-aid specifications are estimated for 1392 four-year public and private universities that include federal student grant aid (i.e., Pell and SEOG grants) and federal loan aid as the primary variables of interest with regard to the Bennett hypothesis. The identification strategy exploits the 1992 HEA policy change that removed home equity from the aid-eligibility formula as an instrument that captures exogenous variation in federal student grant aid. The empirical results show that private universities increase both tuition and institutional aid in response to both increased federal grant aid and federal loan aid, while in-state tuition at public universities is generally not responsive to federal aid. Interestingly, the net tuition increase (tuition minus aid) at

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private colleges differs distinctly across income. For example, high-income students pay $2.75 more in tuition for every dollar increase in grant aid, middle-income students pay an additional $1.51, and low-income students have net tuition lowered by $4.09. Thus, the analysis, while finding support for the Bennett hypothesis at private universities, suggests that tuition increases in response to federal aid are used to price discriminate in favor of providing access to needy students.[13]

Overall, then, there is evidence both for and against the Bennett hypothesis. Specifically, the evidence for in-state tuition charged by public universities tends to reject any substantial or significant effect; alternatively, the evidence for out-of-state public and private tuition tends to support the Bennett hypothesis. Collectively, the results suggest that the pricing behavior of higher education institutions is sensitive to both political and market interests, as well as, perhaps, to individual institutional objectives with regard to access for needy students. Given recent evidence suggesting that some private universities compete and manage enrollments with financial aid (McMillen, Singell & Waddell, 2006), it is paramount to understand how tuition responds to the provision of Pell aid in evaluating whether improved generosity of the Pell program will affect access of needy students to a college education.

THE EFFICACY OF THE GI BILL AND OTHER GRANT AID ON ENROLLMENT

The overarching conclusion of the Pell research is that the demand-side effects of federal aid are relatively small (if not zero). Even worse, the dramatic rise in tuition may be, in part, due to the presence of federal

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[13] Supply-side responses to the provision of aid have also been found for the provision of state level aid. For example, Long (2004) studies a time-series of Georgia-institutions spanning the introduction of Hope using a difference-in-difference approach to identify the exogenous introduction of scholarship aid. She finds that public institutions, while not responding directly in terms of tuition increases that are controlled centrally by the state, did increase room and board fees by 5% on average. On the other hand, private universities in Georgia (with a significant number of HOPE recipients) reduced institutional financial aid by approximately 19%. Overall, the findings suggest that while public institutions recouped nearly 10% of the value of the scholarship by increasing room and board fees, private institutions recouped nearly 30% of the value of the scholarship by increasing tuition and reducing institutional financial aid. Thus, the institutions most affected by the HOPE scholarship responded strategically so as to extract rents created by the program consistent with the Bennett hypothesis.

aid that in the words of William Bennett (1987) have allowed institutions to "blithely raise tuition" (p. A31). Nonetheless, there is still room for optimism that federal grant programs can improve college outcomes. Specifically, while there is little evidence of broad-based effects of the Pell grant on enrollment, there are a number of natural experiment studies that imply that the precursor and inspiration for the Pell program, the GI Bill (and other federal grant programs), did affect the college outcomes of needy students.

The earliest such study by Angrist (1993) examines the extent to which the presence of veteran's benefits affected the level of education and subsequent earning of veterans. The analysis uses the Survey of Veterans data for discharged military personnel from the Vietnam era and the early periods of the All-Voluntary Forces (AVF). Most Vietnam veterans were eligible for the GI Bill, but a majority of those entering under the period of AVF were eligible for the Veterans Educational Assistance Program (VEAP). The VEAP is a contribution based program where contributions were matched by the government at a rate of 2 to 1, which induced a significant fraction of Vietnam veterans not to use the VA program. The analysis restricts the sample to men who are 30–54 years old and who have 1–15 years of service, which permits these service men to reenter into the civilian work force after discharge. An OLS regression of education on a vector of control variables including individual specific dummy variables indicates that the availability of benefits increase schooling by 1.6 years. If the individual fixed effect is correlated with the use of the program (students with more education pre-entry were more likely to obtain education post military), a separate aid effect cannot be identified. Thus, a first-difference approach is used that distinguishes between pre- and post-recruitment returns that are found to be 9.6% versus 4.3%, respectively. Moreover, although specification tests indicate that initial levels of schooling are likely to be correlated with the error terms, an instrumental variables regression using period of service interacted with the entry-level schooling yields similar findings. Thus, grant aid associated with various veterans' programs appear to have increased both education and earnings.[14]

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[14] Other studies have found the GI Bill increased earnings. For example, Card and Lemieux (2001) use 1971 Canadian Census data and 1973 Canadian Job Mobility Survey data to identify the effects of the Veteran's Rehabilitation Act (VRA) upon the educational attainment of Canadian men. Specifically, the analysis uses a sample of approximately 21,000 English speaking men from Ontario and French speaking men from Quebec. The analysis exploits the fact that, due to a failure to participate in WWII, most French speaking men from Quebec were not eligible for the VRA and, thus, form a valid control group. An instrumental variable approach uses an Ontario specific

Bound and Turner (2002) examine whether the combined effect of military service and the availability of subsidies through the GI Bill increased educational attainment of World War II veterans. This analysis again highlights the potential problem that treatment effects are often not randomly assigned. In this case, Census data are used to show that, because physical and mental fitness were prerequisites for military service, comparisons of the educational attainment of veterans and non-veterans from the same birth cohort are likely to overstate the causal effect of military service and the availability of postwar benefits. Nonetheless, the analysis exploits differences between birth cohorts in the likelihood of military conscription generated by changing manpower requirements in the armed forces during the World War II to identify the separate effects of conscription and GI benefits. Specifically, by aggregating data within birth cohorts and using the between-cohort variation in veteran status, the analysis identifies the independent effects of the availability of GI grant aid on the collegiate attainment net of the participation in WWII. The within cohort comparisons of educational attainment between veterans and non-veterans show that those who served in World War II received about 0.4–0.5 years more collegiate training and were eight percent more likely to graduate than those who did not serve. However, conditional on high school graduation and the fraction of veterans who have a high-school diploma, the difference between veterans and non-veterans in terms of average number of years of college completed (graduation rate) declines to 0.2 (4 percent). Nonetheless, overall, the results again suggest that veteran-specific grants improve college access and completion.

Stanley (2003) extends the work of Bound and Turner (2002) on grant-aid effects by exploiting a unique natural experiment arising from differences in the Korean War GI Bill versus the WWII GI Bill. Specifically, Korean War era veterans were eligible for an education subsidy through the GI bill provided they entered the military on or before January 31, 1955, but not after. Thus, the empirical analysis compares the educational outcomes of a sample of veterans who entered the military within a year prior to the cutoff date to those from a sample of veterans who entered within a year after the cutoff date using a difference-in-difference approach. Exploiting data

dummy variable to measure the potential eligibility for VRA benefits as an exogenous determinant of schooling, which yields a return to education for men from Ontario at 15% using an instrumental variables approach.

from the 1973 Survey of Occupational Change in a Generation, the difference-in-difference analysis indicates nearly a 20 percent increase in educational attainment for eligible Korean War veterans or an elasticity of educational attainment of about 0.4 (based on estimated subsidy of approximately 50 percent). Moreover, the estimated effect is larger for younger veterans and those with higher socioeconomic status scores. Overall, while the empirical evidence regarding the efficacy of the Pell grant on access is fairly modest, the results regarding the GI Bill indicate significant and large impacts on college attainment. It follows that understanding the differences between the GI Bill and the Pell program (e.g., entitlement versus not, size of subsidy, group targeted by subsidy) may be critical to identifying the apparent differences in their impact on observed college outcomes.

Other grant aid programs have also been found to improve college outcomes. For example, Dynarski (2002) exploits a natural experiment arising from the elimination of the Social Security Benefit (SSB) program in 1982, which had provided an average of $6,700 to college-age students who had experienced the death of a parent. The analysis uses three years of data surrounding the elimination of the SSB drawn from the NLSY cross-sectional and poverty samples to estimate a difference-in-difference analysis that compares the educational outcomes of eligible versus non-eligible high-school seniors, before the elimination of SSB versus after. A dummy variable for a deceased father is used to determine eligibility, which accounted for 90 percent of the eligible beneficiaries. The difference-in-difference coefficients indicate that about 22 percent more students enter college under SSB by age 28, with $1000 in grant aid estimated to increase the probability of attending college by 3.6 percent. Although the SSB program was not directly comparable to the Pell program because the benefits rose with earnings of the deceased parent, the finding of a significant impact of grant aid on college access even for a student who has lost a parent suggests that a sufficiently generous grant can improve college outcomes. Moreover, the finding of a significant impact of the SSB suggests that the elimination of other federal grant programs (including the SSB) and modifications to state grant programs that occurred concurrently with studied changes in the Pell program should have been considered in evaluating the efficacy of the Pell program (Kane, 1995).

Two papers by Abraham and Clark (2003) and Kane (2004) use natural experiment methodology to analyze the District of

Columbia's Tuition Assistance Grant Program that was instituted in 1999 and allows DC residents to attend public colleges and universities throughout the country at rates considerably lower than out-of-state tuition. Both studies use samples of unaffected college students (e.g., students in nearby cities) as a control group, and find that the number of freshman attending (particularly four-year) colleges outside of DC increased substantially. Interestingly, however, the impact on total enrollment of DC residents is actually quite modest, suggesting that the subsidy had a greater impact on where students went to college as compared to whether they choose to attend college at all. Thus, these studies again suggest that it is easier to influence college choice than it is to influence the choice of attending college or not.

Overall, studies of the GI Bill and other federal grant programs consistently indicate that the college-going behavior of veterans and other targeted groups of students are positively influenced by the generosity of federal grant aid. This evidence combined with the findings that the Pell program can affect the college going behavior of (at least) particular types of students highlights the importance of understanding the nuances in various federal aid programs and how they target federal aid. Thus, the final question to be examined is whether there is a consistent pattern to where federal grants have been found to improve college outcomes, which then can speak to how the Pell program might be altered to improve its effect?

POLICY CONCLUSIONS: WHAT DO WE KNOW?

The Pell program has provided fertile ground for testing whether the introduction of a higher-education voucher and marginal adjustments to its generosity (i.e., through the reauthorization process) affects the college outcomes of low-income students. Federal adjustments to the Pell program provide a useful foil for testing the efficacy of need-based aid because it yields variation in the access and level of financial aid that can be legitimately assumed to be exogenous to unobserved student attributes that also relate to the level of aid awards (e.g., student health status or parent's educational background). The econometric advantages of the Pell program combined with its size, breadth of student coverage, and longevity have led it to be the focus of considerable academic interest. Thus, the Pell program is the source of some of the best and most thoroughly researched analysis of financial aid in the higher-education literature.

01   It is, therefore, regrettable that the preponderance of evidence
02 suggests that even the relatively large increase in the availability (and
03 generosity) of need-based aid brought about by the Pell program and its
04 reauthorizations appear to have had less-than-a-broad-based influence
05 on the college going behavior of low-income students. In other words,
06 research suggests that enticing an otherwise non-college bound, low-
07 income student to matriculate to college with federal aid is not easily
08 accomplished (Kane, 2001). While perhaps disappointing, the results
09 should not necessarily be surprising given that the implicit costs of
10 preparing for college may be quite socially and economically high for
11 the low-income student (e.g., taking and succeeding in college-prep
12 courses or forming the social networks necessary to be informed about
13 the matriculation process), and that these costs are incurred far before
14 the arrival of financial aid upon matriculation.

15   On the other hand, the research also suggests that the Pell program
16 can be successful at influencing access for narrower populations of
17 college students such as independent students for whom the benefits
18 of enrolling in college may be relatively more apparent – e.g., persons
19 who have entered a career and discovered ex post that the lack of a
20 college degree may limit their opportunities in their chosen occupation.
21 Moreover, some research has found that the generosity of the Pell
22 program, while not necessarily directly influencing *access*, per se, has
23 appeared to affect *choice* of college for low-income students. Thus,
24 while the enrollment threshold may be difficult to clear for non-college
25 inclined students, the college-choice threshold and the quality of the
26 match may well be influenced by financial aid. Overall, these findings
27 may indicate that the Pell program has important economic efficiencies
28 by providing low-income students the opportunity to upgrade their
29 skills or their college.

30   Ultimately, the characteristics of the Pell program that account for
31 its longevity and political success may also have limited its economic
32 success. For example, the Pell program by being student-based (as
33 opposed to institution-based) yields its most direct economic benefits
34 to students who are the least likely agent within the higher education
35 system to politically organize and argue for the program. Regular and
36 consistent lobbying of Congress is essential for a 'non-entitlement'
37 Pell program, where the funding must continually be reauthorized.
38 In addition, the interests of students and institutions are not neces-
39 sarily aligned. For example, universities have pushed for Pell program
40 restrictions, such as the half-cost rule, that clearly protect institutional
41 interests at the expense of students. Even worse, the literature testing

the Bennett hypothesis suggests that federal aid might well encourage rent-seeking behavior on the part of universities. Thus, it is not wholly surprising that the history of the reauthorization process shows a steady erosion of the real value of the Pell awards at a time when more politically expedient aid programs such as deferred tax college savings plans at the federal and state level (e.g., 529 plans) and merit-based aid programs at the state and institutional level have received growing support (Dynarski, 2000, 2004).

However, the research suggest that perhaps the potentially greatest weakness of the Pell program is the reauthorization design itself that has led to a focus on marginally adjusting the pre-existing Pell parameters as opposed to more significant and creative adjustments that may be necessary to yield a real lasting effect. In particular, unlike the evidence surrounding the Pell program, studies of the GI Bill, the Social Security Benefits Program (SSB), and the DC Tuition Assistance (DCTA) Program find strong evidence that federal aid can yield significant and economically meaningful changes in college-going behavior (e.g., Abraham & Clark, 2003; Bound & Turner, 2002; Dynarski, 2002). Moreover, merit-based aid programs (e.g., the HOPE scholarship in Georgia), which might well be expected to favor the well-to-do student, have also been found to increase the enrollment propensities of needy students (e.g., Cornwell, Mustard, & Sridhar, in press; Singell, Waddell, & Curs, 2006). Thus, it is reasonable to ask what these programs do that the Pell program does not.

The programs that yield significant effects on college-going behavior are, first and foremost, entitlements. Among the related need-based aid programs, the GI Bill was broadly available to all veterans, the SSB Programs was available to all persons who experience a death in the family, and the DCTA Program is available to all DC residents. Likewise, the Georgia HOPE Scholarship is an example of a merit-based entitlement where all Georgia residents with a high-school average of "B" or better qualify for assistance toward Georgia post-secondary institutions. Thus, these programs entitle qualified students to aid, which reduces uncertainty with regard to the sources of funding and permits students to plan (prepare) for college. Uncertainty regarding funding may be the greatest barrier to college access because needy students (particularly first-generation students) may not have the social capital necessary to fully evaluate whether they have the sufficient resources to attend college and may greatly underestimate their access to financial aid (e.g., Singell & Stater, 2006).

Second, in a related point, most programs that have been found to successfully entice previously non-enrolling students to matriculate have clear and simple rules that determine whether a student qualifies for aid. The Pell program has a myriad of complex (regularly changing) rules that make it hard for a student to know, a priori, the level of federal grant support they will receive. This fact, combined with the non-entitlement status of the Pell grant, means that a student must first apply for college with the confidence that they have the wherewithal to enroll independent of their potential grant aid. Such confidence is likely to be lacking for relatively needy students who may require significant financial support to attend college (e.g., St. John, 2003).

Finally, the most successful programs entitle a student to grant funds that cover a well-specified and significant portion of the cost of college. At the time of their inception, the GI Bill, SSB, DCTA programs, and the HOPE Scholarship all covered most, if not all, of the costs of college, entitling students to both well-defined and generous aid packages that left the student with relatively little debt burden from college and little uncertainty. If needy students are relatively more uncertain about their ability to complete college and less certain about their earning capacity when they complete a degree, they are less likely to take on the necessary debt to go. Risk aversion combined with the rising cost of college and the increasing share of non-subsidized aid in the financial aid package may go along way toward explaining the growing gap of college attendance between needy and non-needy students.

In the end, good aid policy must weigh the costs and benefits of any program and must compare the net benefit of government funds spent in a given use versus its next best alternative. Thus, an important question to ask is whether the federal government should be subsidizing student college access. Driven by a growing return to a college education, a significant and increasing portion of the college-age population (the needy included) find it worthwhile to attend college. Thus, a relevant question might well be whether the additional resources necessary to induce the marginal needy student to enroll in college can justify the expenditure (e.g., Dynarski, 2002). The policy pundits that have been pushing for greater funding for the Pell program have done little to answer such questions.

Nonetheless, from a social perspective, it is unlikely to be optimal to permit a growing educational divide between the income classes and it is here where the evening hand of government is likely to be required to equalize opportunity. Federal courts have already insisted

that we have a constitutional obligation to fund K-12 equally and equitably, and the growing importance of college education in the labor market may well suggest that this principle should be applied to K-16. However, the growing use of merit aid and other non-need-based aid programs by both institutions and states to leverage limited federal aid dollars and influence the choice of the marginal (able) student is evidence that these levels of government are unlikely to have the financial wherewithal or the self-interest to effectively pursue need-blind admissions. Thus, given that the Pell program is the largest federal attempt to level the playing field, it is important to know what modifications to the program will best make use of the federal purse. The body of research to date suggests that the current Pell program is unlikely to be optimal.

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