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TAKING CLASSES AND TAKING CARE OF THE KIDS:
DO CHILDCARE BENEFITS INCREASE COLLEGIATE ATTAINMENT?

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College education is no longer an investment limited to those in their late teens and early 20s. Particularly for women with children, direct costs combined with the organization of the academic program may impede investment in skills that would lead to long-run increases in economic well-being. Childcare costs may prove to be a particularly large hurdle for those women with small children at home. For women who are not working, childcare costs may be the primary direct component of the cost of college attendance. Thus, the introduction of childcare allowances in the Pell grant calculations may have had a substantial impact on enrollment and attainment for low-income women with children.

The 1986 amendments to the Higher Education Act allowed potential students with dependent children to include up to \$1000 in expected childcare costs in the computation of Pell grant awards, beginning in the 1988-89 academic year. For those low-income parents with children, this policy reduced the price of attending college relative to working or staying home.

The focus of this analysis is on how the inclusion of childcare costs in the determination of financial aid affected college enrollment, collegiate attainment, and labor force outcomes among women in their 20s. Beyond measured maternal enrollment and collegiate attainment, some of the effects of this policy may operate through other channels, including outcomes of children. While reduced time at home might lower direct time investment of parents, increases in maternal education may increase family income and, perhaps, the quality of maternal care. Answering these behavioral questions is important in evaluating the overall impact of the Pell childcare subsidy, though the immediate focus of this research is limited to maternal educational outcomes.

The first section places the question in the broader policy context, explaining both the motivation for the introduction of childcare benefits and the historical experiences of women beyond traditional college ages in the higher education system. The second section outlines the microeconomic foundation for how and why the Pell childcare benefits may affect outcomes, and the empirical strategy for identifying the effects of this program. The third section turns to empirical results, which rely on data on the enrollment decisions of women in the NLSY and the October CPS. The final section discusses extensions of the current analysis.

I. Motivation and Legislative History

When the Higher Education Act of 1972 introduced portable grant aid for college students through the Basic Educational Opportunity Grant program (later renamed in honor of Senator Claiborne Pell), legislators gave little thought to how the program would affect collegiate outcomes for non-traditional students. While the legislation was written primarily with the needs and incentives of recent high school graduates still dependent on their parents for support in mind, general openness in the award language dramatically changed opportunities for potential college students in other demographic groups.¹

Nearly three decades later, the majority of the beneficiaries of the Pell grant program are not students falling into the “traditional” mold of recent high school graduates, but rather students who are older, no longer dependent on their parents, and

¹In his historical analysis of federal financial aid, Gladieux (1995) notes that Congress substituted the word “postsecondary education” for “higher education” in the 1972 Reauthorization of the Higher Education Act, effectively broadening the range of options beyond traditional baccalaureate programs open to aid eligible.

often students with families of their own and significant work experience. That the program has expanded to reach a much broader constituency reflects changes in the higher education market, as well as broader social changes. In the initial years of the program, only about 13% of recipients were classified as independent students (1973-74); by academic year 1992-93, the share of Pell grant recipients who were independent reached 62% (College Board, 2001). More recently, with larger birth cohorts in the late teen ages, the share of independent students among Pell grant recipients has receded to about 56%.

There has been considerable research and policy discussion about the extent to which the Pell program has affected outcomes among traditional students, but far less work has focused on evaluating the effect of the Pell program on the educational outcomes of non-traditional students. Few empirical studies have demonstrated that the introduction and generosity of the Pell grant program has had a significant effect on educational decisions of young people immediately after high school graduation. There is, nevertheless, considerable evidence that other grant aid programs that are more transparent (such as the Social Security Student Benefit Program) had a substantial effect on college enrollment and attainment.

Very little is known about how potential students beyond their late teens make decisions about college enrollment and educational attainment or how public policies affect these choices. Among the few papers that have examined outcomes for non-traditional students, Seftor and Turner (2002) find that older students demonstrated considerable responsiveness to the introduction of the Pell grant and changes in benefit generosity. A small set of papers, including Jacobson, LaLonde and Sullivan (2002),

examine the effect of Pell grant availability on educational attainment of displaced workers. Yet, none of these efforts successfully addresses the extent to which college participation yields course or degree completion and improved economic outcomes.

In a general sense, eligibility for federal financial aid under the Pell grant program and other Title IV financial aid programs depends on the difference between estimated cost of attendance (COA) and estimated ability to pay measured by the student aid index (SAI). COA is the sum of tuition and room and board. For those students not residing in dormitories, there is a standard maximum allowance for rent and transportation. The SAI is adjusted downward for the number of dependents and upward with individual income and assets. Specifically, the SAI term begins with individual income and assets.

Expected federal and state taxes are subtracted as well as an offset varying positively with family size. This final difference is multiplied by an assessment rate (25% in 1987-1988 and progressively increasing in later years) to produce the SAI. Pell eligibility is the minimum of the SAI subtracted from COA and the maximum allowable Pell grant. The maximum Pell grant, in nominal dollars, was \$2100 in 1987-88 and \$2200 in 1988-89; as a contemporary reference point the maximum Pell grant is \$3750 in 2001-02. An additional stipulation, removed in 1992, is that an individual's maximum Pell grant could not exceed 60% of the COA, representing the idea that college costs were expected to be a shared burden for all students.

With the 1986 Reauthorization of the Higher Education Act (PL 99-493), Congress introduced an allowance for childcare of up to \$1000 (for all children) in the calculation of cost of attendance.² This provision took effect with the 1988-89 academic

² Prior to this point there was some divergence across programs in the treatment of childcare expenses. While there was no provision to this point for childcare under the Pell grant program, campus –

year. It is this change in program generosity, targeted to those with children, that provides the fundamental identifying information for this analysis. With the subsequent reauthorization of the Higher Education Act in 1992, the childcare provision was uncapped (allowing potential students to claim expenses up to the maximum allowable college cost), beginning in academic year 1993-1994.

Because the childcare allowance was included directly in the cost of attendance, it had the potential to increase the amount of Pell grants received (not including additions to access to subsidized loans) by \$1000 -- though for most students attending low cost public institutions the expected increase in the Pell grant is likely to be somewhat less. Many individuals receive less than the maximum Pell grant available to them because the formula-estimated cost of attendance is quite low. Even with the maximum non-residential allowance for housing and transportation of \$1600 in 1987-88, few students attending a local community college would have received the maximum Pell grant available to them. Table 1 presents in-state community college tuition levels; the national average was \$782 in 1987-88 and \$828 in 1988-89. Since Pell grants were limited to 60% of college costs for this period, even the neediest applicant would have received less than the maximum Pell grant. For women in their mid-20s, community colleges and other open access institutions are likely to be the primary institutional choice. In fact, Kane and Rouse (1999) find that over 35% of community college students are over the age of 30 (compared to 22% of four-year college students.) Since few community colleges charge tuition above \$1000, it is likely that many women with children would be eligible for substantial increases in aid with the addition of childcare benefits. This,

based programs and guaranteed student loan programs provided for "reasonable incurred expenses." For these other programs, the Higher Education Act of 1986 introduced a more inclusive definition, covering

together with evidence that community college enrollment is sensitive to changes in college costs (Rouse, 1994), points toward the potential for sizable enrollment response by women at least in two-year colleges.

Thus, the effect of the introduction of the childcare allowance was to shift up allowable college costs and thus Pell grant amounts for people with children, but not for similarly situated individuals without children. Complicating matters somewhat, other changes in the need calculation yield an effect different than a constant increase in Pell grant amounts for women with children relative to those without children. First, the allowance for living expenses in the calculation of the overall cost of attendance for independent students increased from \$1600 to \$2000, affecting those with and without children. Second, the assessment rate applied in the calculation of the SAI changed from a constant 25% to a non-linear scale increasing from 11% to 25% over the income range, effectively changing the "kinks" in benefit reduction with income. A final change in the income protection allowance for those married without children led to a reduction in awards for some. Figure 1 presents hypothetical changes in Pell eligibility by family circumstances. Large gains, varying somewhat over the eligible incomes, accrue to those with children -- at issue is how such changes affect collegiate investments.³

The economic rationale for adding resources for childcare to the Pell grant program is twofold. First, women with children requiring care while they are in class may be particularly credit constrained and inability to finance childcare may force them to forego otherwise optimal investments in education and training. Second, subsidies

all dependent care in addition to childcare expenditures.

³ As is evidenced in the figure, the decline in the income protection allowance for those married without children, leads to a reduction in expected benefits for many in this group after 1988 and, for this

may affect the quality (as well as quantity) of childcare that children receive, generating externalities in the form of developmentally prepared students.⁴

In thinking about how non-traditional students use Pell grants and other Title IV aid administered by the Department of Education, “education policy” may intersect with other employment and social service policies. While it is common for economists to focus on how social insurance programs affect employment outcomes, attending college is an additional option for many individuals. One question is whether these programs “compete” with programs like JTPA in the sense that potential beneficiaries choose between aid programs. It is certainly the case that those workers that are the target for workforce programs such as JTPA or the more recent Workforce Investment Act (WIA) receive a significant share of job training in the community college environment.

Jacobson, LaLonde and Sullivan (2002) found that about one-fifth of a sample of displaced workers in Washington state enrolled in a community college around the time of job loss. Of those enrolling in a community college, about 17 percent were also participants in JTPA.

In addition to interactions with employment insurance programs, the availability of education aid through programs like Pell may affect participation in social service programs like Aid to Families with Dependent Children (AFDC) and, more recently, Temporary Assistance to Needy Families (TANF). Moreover, the generosity and benefit reduction rates of social insurance programs like the Earned Income Tax Credit affect not only the likelihood of labor force participation and hours of work, but also incentives for

reason, we exercise some caution in treating this group “as if” they were unaffected by the policy change in the empirical work that follows.

⁴ Blau (2001) suggests that employment-based (or similarly, education-based) subsidies are unlikely to resolve the problem of underprovision of high quality childcare.

collegiate investments. The incentives of programs traditionally regarded as social insurance or social welfare influence educational investments, as well as labor force participation. In turn, programs funded as student aid -- such as the Pell grant program -- potentially affect labor force participation in addition to educational attainment.

The interaction of financial aid programs and other income support programs has increased with legislative changes over the last decade. The shift from the rules and benefits of AFDC to those of the TANF program brought about by the 1996 Personal Responsibility and Work Reconciliation Act (PRWORA) has altered the incentives for low-income women with children to pursue secondary training. One study notes the wide variation among states under the new law in the treatment of college enrollment toward the work requirement. For example, California, New York, and Pennsylvania are three states that, as of 1998, did not allow welfare recipients to count education toward work requirements and 22 other states have similar policies (National Urban League, 2002). Those permitting education in lieu of employment often have limits on the duration of applicable enrollment. An example of how the policy change -- combined with other changes in requirements at the local institution -- has affected behavior is evidence citing the drop in welfare recipients enrolled at City University of New York from 27,000 in 1995 to 5,000 in 2000 (National Urban League, 2002).

Women with children have long been the target of many social service programs, with explicit reference to the potential barriers to sustained employment created by childcare expenditures. A distinguished research literature in the field of labor economics focuses on how childcare costs affect labor force participation. Starting with

the seminal analysis of Heckman (1974), variation in childcare costs has been found to be a key determinant of women's labor force participation.

More recently, analyses such as Meyer and Rosenbaum (1999) document the extent to which much of the rise in the employment of single mothers in the early 1990s can be attributed to the increased generosity of the Earned Income Tax Credit, through the Omnibus Budget Reconciliation Act of 1990. The growth of the EITC is, perhaps, the most sizable policy expansion of the late 1980s and early 1990s, as Meyer and Rosenbaum (2000) note the 10-fold increase in real dollar expenditures from this channel targeted primarily to families with children. Because the credit is increasing with hours worked and then reaches a plateau before a benefit reduction rate sets in, the opportunity cost of college enrollment is reduced over the range where the EITC declines with additional hours worked. As such, the construction of the EITC combined with the availability of federal financial aid to low income adults may well create a substantial incentive to combine school and work, particularly for low-income families with children.⁵

The overlay of policies that affect decisions to attend school is appreciably more complicated than just the EITC and the federal financial aid programs. As Meyer and Rosenbaum (2000) outline, the last two decades have seen sizable changes in program requirements and benefit generosity in a range of related programs including food stamps, AFDC, and Medicaid, with these changes potentially affecting enrollment decisions as well as labor supply. In the context of the AFDC program, the JOBS (Job

⁵ One strategy for sorting out the effect of the JOBS program is to take advantage of the exemption of women with very small children from participation. Similarly, variation in program implementation across states – such as that employed by Meyer and Rosenbaum (2000) -- could be used to identify specific program effects.

Opportunities and Basic Skills Program), passed under the Family Support Act of 1988 and instituted largely in 1990, required a large share of the caseload to participate in job search assistance and a limited degree of classroom training (LaLonde, 1995). At issue is the extent to which this program increased educational attainment, potentially acquainting more individuals with the post-secondary system, or, alternatively, decreasing the takeup of education benefits by substituting for education assistance under programs like Pell.

Many policy analysts, particularly in the late 1980s and early 1990s, raised the awareness of the absence of affordable and quality childcare as one of the primary barriers to labor force participation, particularly among unwed mothers. Yet, while much analysis has focused on the question of how childcare costs affect labor force participation, researchers have largely ignored participation in education as an alternative in the choice set affected by childcare costs and the more general set of social insurance programs. At the same time, identifying effects of particular program initiatives such as the addition of a childcare allowance to the Pell grant program is complicated by the tangled – and changing – web of policies available to the target population of women at or near the edge of poverty. For example, Robins (1991) notes 46 separate federal programs providing some form of childcare assistance in 1989, while Meyer and Rosenbaum (2000) outline many detailed and overlapping changes in Medicaid, the EITC, and AFDC in the late 1980s and early 1990s. The challenge in the empirical section that follows is to identify an estimation strategy distinguishing the effects of the introduction of the childcare allowance in the Pell program from other policy changes

that might plausibly affect the college enrollment rate of the potential beneficiaries of this program or the comparison group.

II. Estimation Strategy

Following much of the literature examining women's labor force participation, the price of childcare has a clear effect on how women choose to allocate time. Childcare costs have the effect of reducing the effective hourly wage when women are working and the process of finding appropriate childcare is often modeled as an additional fixed cost. For women with children contemplating enrollment in school, the costs of college include not only the traditional foregone wages and tuition but also the costs of childcare. Childcare subsidies for work or school alter the tradeoff between these options, in addition to changing the tradeoff between staying home and either work or school. As an empirical matter, for most individuals the choice is not work or school, but rather what combination of these activities the individual selects. The objective of this analysis is to use changes in allowances in the Pell program to estimate the effect of this type of benefit on the enrollment decisions of women with children.

Adding a benefit like the Pell grant to the budget set (or changing the amount of this grant) has both income and price effects in the determination of educational attainment and employment. Over some region, Pell grants shift out the budget constraint producing a positive income effect throughout this region. In addition, such subsidies alter the tradeoff between work and school. Moreover, grant and loan aid for college has the potential to reduce credit constraints, changing the effective rate at which an individual can borrow. A notable feature of the Pell childcare allowance is that it is

largely fungible with other resources and the recipient is not required to demonstrate an increase in childcare expenditures or actual expenditures corresponding to the amount specified in the aid budget.

In trying to measure the effect of the inclusion of childcare expenses in the cost of attendance, we follow a difference-in-differences identification strategy. This approach has been used in several other studies of the behavioral effects of student financial aid, including Dynarski's (2003) study of the Social Security Student Benefit program and studies of the Pell grant program by Hansen (1983), Kane (1995), and Seftor and Turner (2002). The idea is to compare college enrollment of those eligible for the childcare benefits (women with children) in the years before academic year 1988-89 to their enrollment when the benefits were available relative to a group not eligible for the childcare benefits (women with no children) over this same interval. In a regression context, this specification is:

$$Enr_i = \mathbf{b}_0 + \mathbf{b}_1 Kids_i + \mathbf{b}_2 Post_i + \mathbf{b}_3 Post \times Kids_i + \mathbf{e}_i$$

where kids is an indicator for having children, post is a dummy variable for year of observation in the fall of 1988 or later, and $Post \times Kids$ is the interaction between these two variables. β_3 is the parameter of primary interest and, without covariates, is identical to the subtraction of means for each group across the time periods (double differencing). The key identifying assumption is that this estimated coefficient would be zero in the absence of a policy change (or $E[\mathbf{e}_i | Post \times Kids_i] = 0$) and the only factor affecting enrollment behavior of women with kids, but not affecting enrollment behavior for similar women without children, is the change in benefit generosity brought about by the introduction of the allowance for childcare costs. The introduction of covariates (such as

AFQT) captures potential changes in the composition of the treatment and control groups over time. Introducing time varying covariates ($AFQT \times Post$) further isolates the variation identifying the parameter of interest, while eliminating the effects of changes over time in covariates correlated with the treatment group.

There are several specification checks afforded by the data. In addition, variation across states in prices at community colleges, as well as variation among individuals in their proximity to college, may serve to focus attention on those most likely to be affected by the policy change. Initially, we have estimated the effects of the policy on enrollment using a linear probability model. However, heteroskedasticity is an inherent problem with this specification, in addition to the restriction of constant marginal effects across all values of the parameters. Moreover, given that our empirical specifications fundamentally rely on longitudinal data, we are sensitive to the likely understatement of standard errors associated with correlation within units of observation (Bertrand, Duflo, Mullainathan, 2002). We present standard error estimates adjusted for clustering at the level of the individual to address this problem throughout the analysis.

It is also important to be clear about the strengths and weaknesses of this identification strategy, concurrently acknowledging the feasibility of potential extensions in future work. The long literature on the evaluation of job training programs led by Heckman and his coauthors underscores the importance of the consideration of individual heterogeneity in the estimation of treatment effects. Quite plainly, the difference-in-differences estimation strategy outlined above gives us only average local treatment effects, implying that the educational gains may well differ appreciably among the eligible population.

III. Empirical Analysis

While the rise in the labor force participation of women with children is one of the most often-noted changes over the last decade in the work force, the change in the composition of college students over the past three decades has been nearly as remarkable, though the causes and consequences of this transformation have not been widely noted. Not only have overall undergraduate enrollment rates of students in their 20s and 30s risen, but the increases have been particularly large among married women with children.

In this section, we begin by tracing out the descriptive changes in collegiate participation of women. Much of the overall change in this market over the last decades reflects changes in demographics adjustments in the market for higher education such as the increased availability of non-residential programs and increases in return to education in the labor market. The specific empirical question that is the focus of this analysis is whether the 1988 policy of allowing for the inclusion of childcare costs in Pell grant calculations had an appreciable effect on enrollment as well as on a broader set of outcomes such as collegiate completion, earnings, and choice of childcare provider.

Between 1970 and 1990, college enrollment among women in their mid-late 20s has increased by a factor of more than 6, from 1 percent to about 6.7. The increases among married women and women with children have been particularly striking (Figure 2). The enrollment rates for unmarried women with children rose by a factor of more than 4 between 1970 and 1990, while the enrollment rates of women with children in their 20s rose by a factor of about 7. These changes are particularly striking against the backdrop

of near stagnation in the enrollment of recent male high school graduates over the same interval.

Looking at these enrollment rates by age (Figure 2) shows that for all groups except single women without kids, these enrollment rates do not “die off;” instead, they remain relatively flat through the 20’s. What the data suggest, then, is that many women into their 20s return to school with children to work toward college completion or to gain additional skills prior to labor force entry. Overall, there is some transition from college enrollment to receipt of a BA degree at these levels, though it is appreciably less than what one would predict if individuals were enrolled as full-time students.

The October Current Population Survey provides a starting point for an empirical analysis, with wide demographic annual coverage and detailed data on the enrollment of older students. Other CPS instruments only ask enrollment question to those under 24. (There are disadvantages to the CPS, including the difficulty in identifying maternal fertility directly and relatively small samples at the single-age level.) Focusing on those women aged 24 to 34 in the 1985 – 1990 survey years, we limit the analysis to those having attained less than a BA (16 completed years) in schooling. In constructing “before” and “after” dimensions of the comparison of enrollment outcomes, the fall of 1988 represents the statutory breakpoint. A key question is how many years of observation to include prior to 1988 and subsequent to this point. The tradeoff is that the additional years increase the precision of the estimates while also representing something of a deviation from the sharp before-after comparison, increasing potential biases caused by confounding trends or policies.

The regression results presented in Table 2 show that the introduction of childcare benefits between 1987 and 1988 has a substantial and positive effect on the enrollment of women with children, about 1-3 percentage points in magnitude for the population ages 24-34. Adding covariates (column 2) leaves the point estimates virtually unchanged. As noted in the previous section, the introduction of employment and training programs targeted to women with children in 1990 (JOBS) may undermine the validity of these estimates. Additional specifications (columns 3 and 4) repeat this analysis, focusing on the narrower range of observation between 1986 and 1989, yield very similar results. The data from the CPS also afford a potential glimpse into how the 1988 policy change has affected college choice and labor force activity. The one clear result is that the enrollment increase is concentrated nearly entirely at public colleges and universities, with the share of the population enrolled in public universities showing an increase equal to the overall increase in enrollment. Evidence on changes in unemployment and major activity is consistently zero, though this question merits consideration with alternative data. Simple cross-tabulations show that of those women enrolled as undergraduates, 78 percent of those without children and 58 percent of those with children were also in the labor force. The decision to enroll in college is less likely to be seen as “school or work,” but rather what combination of “school and work” will an individual choose.

Beyond the broad measures provided in the CPS, the National Longitudinal Survey of Youth is uniquely suited to the study of enrollment decisions of women in their 20s over this interval. Focusing on cohorts born between 1957 and 1964, these individuals were between the ages of 21 and 28 in 1985 and 26 and 33 in 1990. For the NLSY, we measure enrollment in October and May; for the latter measure, 1989 is the

first year of observation in which the childcare benefits would have affected behavior. Starting with the comparison of groups of similar ages before and after the policy change, we present variable means for each group in Tables 3A and 3B, with the first table for all women and the second for unmarried women. Note that we do not use all cohorts and all years of data to make this comparison. Appendix Table 1 provides a schematic of the comparison we make. Our objective is to make our “before” and “after” comparison groups as similar as possible in all dimensions, including age, and using selected years and cohorts of the panel helps to achieve this objective.

The first result, in the top row of Table 3, shows the college enrollment levels for women with and without childcare in the pre-and post-period. The difference estimate shows the clear and significant measured effect: 0.04 percentage points for all women and 0.05 and for unmarried women. (As considered later in this section, it is plausible that the estimates, especially for children, are also capturing the effect of the introduction of the JOBS program).⁶

The additional rows in Table 3 provide means and difference estimates for other potential covariates. There are notable differences between women with children and women without children in characteristics, but the changes in these differences over time are largely insignificant. For example, 85 percent of women without children resided in an MSA in 85-89 while 77 percent of women with children resided in an MSA; these numbers were 82 percent and 76 percent in the 1989-90 interval. Thus, so long as the distribution of the population by these characteristics remains largely unchanged over the

⁶ We present enrollment results for May, as well as October, and compare 85-88 to 89-90 for May and 85-87 to 88-90 for October.

total period, our estimate of the effect of the policy enrollment should be robust to the addition of covariates.

These regression-based difference-in-differences estimates are presented in Table 4 with (column 2) and without (column 1) additional covariates. The first three rows of the table present estimates for all women, while the last three rows focus only on unmarried women. Rows also differ in the number of years of observation and the age groups represented. The point estimates change little with the addition of covariates. Narrowing the years of observation leads to some variability in the point estimates with those for 86-89 somewhat larger than those for the other years. Further investigation will help to sort out the extent to which this is attributable to the change in years or age groups across specifications.

A related approach is to exploit the repeated observation of individuals over this interval to estimate a fixed effects specification. Because the average age of the sample is necessarily greater “after” than “before,” some care is necessary in the specification of age in this model, and we consider the implications of adding interactions between age and the presence of children. Presented in Table 5, coefficients are slightly smaller in magnitude but nevertheless similar in Table 4 with the effect of the policy about 0.022 for all women and 0.027 for women with children.

The results from Tables 4 and 5 point to a substantial effect of the change in Pell grants benefit determination in the form of the introduction of child care costs in the calculation of the cost of attendance between 1987 and 1988 on enrollment. In comparing results, we favor the estimates excluding 1989 and 1990 because in these years other “treatments” also targeted to the childcare needs of women with children

were also put in place. Further, while the finding that married women with children increased their enrollment relative to married women without children is striking; this result captures both the increased benefit generosity for married women with children and the reduction in benefit generosity for women without children. To this end, the results for unmarried women of a program effect of between 3 and 4 percentage points are most persuasive, even as they are estimated with less precision.

To support the conclusion that it is changes in student aid – rather than other policies affecting the choice of women among work, home and school – we have examined the share of the population with less than a BA degree receiving education aid using the same difference-in-differences methodology. Over the 1988-89 interval, we find that the proportion of single women with children receiving education aid increased by 0.03 (0.015) or 3 percentage points and we get a similar estimate using the fixed-effects estimator (bottom panel of Table 5).

Of course, college enrollment is only an intermediate product in evaluating how public policies such as subsidies for childcare affect long-term social and economic outcomes. An important next question concerns how enrollment translates to completed education. For a small number of cohorts and ages we are able to measure changes or “gains” in completed years of education that are plausibly related to the introduction of childcare benefits. [Tables need to be rerun.]

III. Conclusion and Next Steps

This analysis offers a basic difference-in-differences estimation strategy as a starting point for the examination of how childcare benefits affect decisions to enroll in

college. Our estimates point to a very sizable impact of the introduction of childcare expenses in the calculation of Pell grant benefits on the enrollment rate of women with children. For all women with children, these effects are estimated to be on the order of 3 percentage points, and for single women with children these effects are less precise, but on the order of between 2 and 4 percentage points. What these results imply is that this population is very responsive in enrollment decisions to changes in the availability of financial aid.

Understanding whether demand for college among this group of women is simply very elastic or whether financing childcare cost is a constraint in making educational investments is a significant question for education policy. While most of this analysis focuses on college enrollment, it is how induced participation translates to attainment and improved earnings that should be the standard for evaluating the substantial federal investment in student aid. Other data sources, such as the SIPP, may be particularly well-suited to the measurement of choices beyond enrollment that may be affected by changes in the determination of the Pell awards. Beyond the educational and employment outcomes of adults, how the availability of education-based childcare subsidies affects the quantity and quality of childcare provided by families is an important long-term dimension of the evaluation.

References

- Bertrand, M., E. Duflo, S. Mullainathan. 2002. "How Much Should we Trust Differences-in Differences Estimates?" NBER Working Paper 8841.
- Blau, D. 2001. *The Child Care Problem: An Economic Analysis*. New York: Russell Sage Foundation.
- College Board. 2001. *Trends in Student Aid*.
<http://www.collegeboard.com/press/cost01/html/TrendsSA01.pdf>
- Dynarski, S. forthcoming. "Does Aid Matter? Measuring the Effect of Student Aid on College Attendance and Completion." *American Economic Review*.
- Gladieux, L. 1995. "Federal Student Aid Policy: A History and an Assessment."
<http://www.ed.gov/offices/OPE/PPI/FinPostSecEd/gladieux.html>
- Hansen, W. L. 1983. "Impact of Student Aid on Access." In *The Crisis in Higher Education*, Edited by Joseph Froomkin. New York: Academy of Political Science.
- Hansen, W. L. 1983. "Good Intentions and Mixed Results: An Update on the BEOG Program Eight Years Later." In *Public Expenditure and Public Analysis*, ed. R. Haveman and J. Margolis: 493-512. New York: Rand McNally.
- Heckman, J. 1974. "Effects of Child-Care Programs on Women's Work Effort." *The Journal of Political Economy*, Vol. 82, No. 2, Part 2: Marriage, Family Human Capital, and Fertility. (Mar. - Apr., 1974): S136-S163.
- Jacobson, L., R. LaLonde, and D. Sullivan. 2002. "Schooling and Training Participation by Displaced Workers." *Chicago Policy Review* 6 (1).
- Kane, T. 1995. "Rising Public College Tuition and College Entry: How Well do Public Subsidies Promote Access to College?" NBER Working Paper No. 5164.
- Kane, T. and C. Rouse. 1999. "The Community College: Training Students at the Margin Between Education and Work." *Journal of Economic Perspectives*. 13 (1): 63-84.
- LaLonde, R. 1995. "The Promise of Public Sector-Sponsored Training Programs." *Journal of Economic Perspectives* 9(2):149-68.
- Meyer, B. and D. Rosenbaum. 1999. "Welfare, the Earned Income Tax Credit, and the Labor Supply of Single Mothers." NBER Working Paper 7363.
- Meyer, B. and D. Rosenbaum. 2000. "Making Single Mothers Work: Recent Tax and Welfare Policy and Its Effects." NBER Working Paper 7491.

National Urban League Institute for Opportunity and Equality. 2002. "Negative Effects of TANF on College Enrollment." Special Research Report, SRR-01-2002.

Robins, Philip K. 1990. "Child Care Policy and Research: An Economist's Perspective." In *The Economics of Child Care*: 11-42.

Rouse, C. 1994. "What to Do After High School? The Two-Year vs. Four-Year College Enrollment Decision." In *Choices and Consequences: Contemporary Policy Issues in Education*, ed. R. Ehrenberg: 59-88. New York: ILR Press.

Seftor, N. and S. Turner. 2002. Federal Student Aid and Adult College Enrollment. *Journal of Human Resources* 37 (2): 336-352.

Table 1: Resident tuition and fees at community colleges by state, 1987-88

	1987-88	1988-89
Alabama	600	600
Alaska	766	720
Arizona	445	487
Arkansas	607	610
California	100	100
Colorado	778	816
Connecticut	708	790
Delaware	771	876
Florida	678	691
Georgia	897	931
Hawaii	325	365
Idaho	737	780
Illinois	815	823
Indiana	1,343	1,418
Iowa	937	1,034
Kansas	700	700
Kentucky	560	580
Louisiana	830	980
Maine	800	900
Maryland	1,020	1,062
Massachusetts	936	1,027
Michigan	857	927
Minnesota	1,238	1,305
Mississippi	616	646
Missouri	572	606
Montana	479	479
Nebraska	735	769
Nevada	626	626
New Jersey	993	1,047
New Mexico	447	504
New York	1,389	1,408
North Carolina	225	225
North Dakota	1,208	1,266
Ohio	1,190	1,321
Oklahoma	602	747
Oregon	684	720
Pennsylvania	1,182	1,278
Rhode Island	900	950
South Carolina	593	613
Tennessee	681	716
Texas	581	566
Utah	968	1,023
Vermont	1,304	1,424
Virginia	763	779
Washington	759	780
West Virginia	650	724
Wisconsin	1,393	1,402
Wyoming	547	583
<i>National Average**</i>	782	828

Table 2: Regression estimates of the effect of the introduction of Pell childcare benefits on college enrollment, CPS data, 1985-1989

	All Kids, 1985-1990		All Kids, 1986-89	
	No	Demographic	No	Demographic
	Covariates	Covariates	Covariates	Covariates
	(1)	(2)	(1)	(2)
Undergraduate Enrollment	0.013 (0.008)	0.013 (0.008)	0.016 (0.009)	0.016 (0.009)
College Full Time		0.005 (0.004)		0.006 (0.005)
4 Year College		-0.002 (0.006)		0.001 (0.006)
Public College		0.015 (0.007)		0.017 (0.008)
Unemployed		0.000 (0.006)		-0.001 (0.007)
Major Activity, School		0.003 (0.004)		0.002 (0.005)
Major Activity, Work		-0.006 (0.012)		0.002 (0.015)
Major Activity, Home		-0.007 (0.011)		-0.014 (0.013)

Note: Data are from the October CPS and include observations of women ages 24-34 with less than 16 years of completed education. Cases with allocated values for age, race, sex, and enrollment are excluded. Dummy variables for age, post (1988 and 1989 years of observation), and the presence of kids are the other covariates in columns (1) and (3). Columns (2) and (4) include covariates for race, metro status, and marital status in addition to the covariates in the first estimation. Parameter estimates are the coefficients on the Post x Kids.

Table 3A: Means of enrollment and demographic variables, NLSY, 1985-1990, All Women

	Ages 26-28, All Women				D in D (Std. Err)
	1985-1988		1989-1990		
	No Kids Mean (Std. Dev)	W/ Kids Mean (Std. Dev)	No Kids Mean (Std. Dev)	W/ Kids Mean (Std. Dev)	
Enrolled in College (May)	0.15 (0.36)	0.04 (0.19)	0.13 (0.33)	0.05 (0.22)	0.04 (0.02)
Enrolled in College (Oct)	0.14 (0.35)	0.04 (0.19)	0.12 (0.32)	0.04 (0.21)	0.03 (0.02)
Number of Children	0.00 (0.00)	1.84 (0.90)	0.00 (0.00)	1.78 (0.91)	-0.05 (0.03)
Married	0.38 (0.49)	0.77 (0.42)	0.44 (0.50)	0.73 (0.45)	-0.11 (0.03)
In Poverty	0.15 (0.36)	0.28 (-0.45)	0.20 (-0.40)	0.33 (-0.47)	0.00 (0.02)
Rec'd AFDC	0.00 (0.03)	0.12 (0.33)	0.00 (0.00)	0.14 (0.34)	0.02 (0.01)
AFQT	59.17 (26.55)	42.34 (26.63)	53.78 (26.21)	37.35 (24.85)	0.40 (1.49)
Black	0.10 (0.30)	0.17 (0.38)	0.09 (0.29)	0.18 (0.39)	0.01 (0.01)
Reside MSA	0.85 (0.36)	0.77 (0.42)	0.85 (0.35)	0.76 (0.43)	
Region NE	0.24 (0.43)	0.17 (0.37)	0.23 (0.42)	0.14 (0.34)	
Region NC	0.24 (0.43)	0.29 (0.45)	0.24 (0.43)	0.30 (0.46)	
Region South	0.34 (0.47)	0.37 (0.48)	0.33 (0.47)	0.38 (0.49)	
N	2761	4790	1545	2669	

Note: Observations missing data on AFQT, race, marital status or May college enrollment in a year are excluded from the sample in that year. Standard deviations are in parentheses in the first four columns. Difference-in differences employ the sample weights, as "poverty" and "military" oversamples are included. Standard errors in parentheses in the difference-in-differences column are adjusted for clustering at the individual level.

Table 3B: Means of enrollment and demographic variables, NLSY, 1985-1990, Unmarried Women

	Ages 26-28, Unmarried Women				D in D (Std. Err)
	1985-1988		1989-1990		
	No Kids Mean (Std. Dev)	W/ Kids Mean (Std. Dev)	No Kids Mean (Std. Dev)	W/ Kids Mean (Std. Dev)	
Enrolled in College (May)	0.17 (0.38)	0.06 (0.24)	0.14 (0.34)	0.07 (0.26)	0.04 (0.03)
Enrolled in College (Oct)	0.16 (0.37)	0.06 (0.25)	0.12 (0.32)	0.07 (0.25)	0.04 (0.02)
Number of Children	0.00 (0.00)	1.81 (0.97)	0.00 (0.00)	1.81 (0.97)	0.00 (0.05)
In Poverty	0.18 (0.39)	0.59 (0.49)	0.25 (0.44)	0.62 (0.48)	-0.04 (0.04)
Rec'd AFDC	0.00 (0.04)	0.36 (0.48)	0.00 (0.00)	0.36 (0.48)	0.00 (0.03)
AFQT	57.66 (27.34)	30.97 (23.63)	52.85 (26.09)	26.92 (21.92)	0.77 (2.13)
Black	0.13 (0.33)	0.39 (0.49)	0.12 (0.32)	0.36 (0.48)	-0.02 (0.03)
Reside MSA	0.86 (0.35)	0.80 (0.40)	0.87 (0.34)	0.77 (0.42)	
Region NE	0.25 (0.43)	0.14 (0.35)	0.23 (0.42)	0.14 (0.35)	
Region NC	0.23 (0.42)	0.28 (0.45)	0.24 (0.42)	0.29 (0.46)	
Region South	0.35 (0.48)	0.41 (0.49)	0.32 (0.47)	0.37 (0.48)	
N=	1733	1396	910	897	

Note: Observations missing data on AFQT, race, marital status or May college enrollment in a year are excluded from the sample in that year. Standard deviations are in parentheses in the first four columns. Difference-in differences employ the sample weights, as "poverty" and "military" oversamples are included. Standard errors in parentheses in the difference-in-differences column are adjusted for clustering at the individual level.

Table 4: Regression estimates of enrollment, NLSY women (October enrollment)

	Difference-in-differences	
	estimated effect (post*kids)	
	Coeff (Std. Err) (1)	Coeff (Std. Err) (2)
All women, 85-90, Ages 26-28	0.032 (0.014)	0.03 (0.014)
All women, 86-89, Ages 25-29	0.056 (0.012)	0.055 (0.012)
All women, 87-88, Ages 24-30	0.032 (0.012)	0.032 (0.012)
Not Married, 85-90, Ages 26-28	0.051 (0.022)	0.05 (0.021)
Not Married, 86-89, Ages 25-29	0.069 (0.017)	0.067 (0.017)
Not Married, 87-88, Ages 24-30	0.038 (0.018)	0.037 (0.018)

Note: Each entry in the table is the coefficient on Post \times Kids in a regression with October college enrollment as the dependent variable. Specification (1) also includes indicators of the presence of children, post (1988 and later), age-specific effects and a constant. Specification (2) adds covariates for AFQT, race, and place residence. All standard errors are corrected for individual level clustering.

Table 5: Fixed individual effects estimates, NLSY women, 1985-1990

	Coefficient on Post*With Children	
	Simple D-D Individual Fixed Effects (1)	Include Cov., Individual Fixed Effects (2)
<i>College Enrollment (May)</i>		
All women, 85-90	0.022 (0.006)	0.015 (0.006)
Single Women, 85-90	0.027 (0.011)	0.021 (0.011)
<i>Received Educational Benefits</i>		
All women, 85-90		0.018 (0.005)
Single Women, 85-90		0.029 (0.010)

Notes: Each entry in the table is the coefficient on Post x Kids in a fixed effects regression with college enrollment as the dependent variable. Specification (1) also includes indicators of the presence of children, post (1989 and later), age-specific effects and a constant. Specification (2) adds covariates for age, place of residence, and marital status as appropriate. All standard errors are corrected for individual level clustering.

Appendix Table 1: Cohorts and years of observation

Panel A:

Year of Birth	Year of Observation					
	1985	1986	1987	1988	1989	1990
1957	28	29				
1958	27	28	29			
1959	26	27	28	29		
1960		26	27	28	29	
1961			26	27	28	29
1962				26	27	28
1963					26	27
1964						26

Panel B:

	Year of Birth	Year of Observation									
		1983	1984	1985	1986	1987	1988	1989	1990	1991	1992
a.											
Control	1959	24				28					
Treatment	1964						24				28
b.											
Control	1958	25			28						
Control	1959		25			28					
Treatment	1963						25				28
c.											
Control	1958		26		28						
Control	1959			26		28					
Treatment	1962						26		28		
Treatment	1963							26		28	
Treatment	1964								26		28
d.											
Control	1957		27	28							
Control	1958			27	28						
Control	1959				27	28					
Treatment	1961						27	28			
Treatment	1962							27	28		
Treatment	1963								27	28	
Treatment	1964									27	28

Notes: This table shows the birth cohorts and years of observations used to produce the gains in collegiate attainment before and after the fall of 1988 in the results presented in Table 6.

Figure 1: Predicted Pell grant amount marital status and presence of children

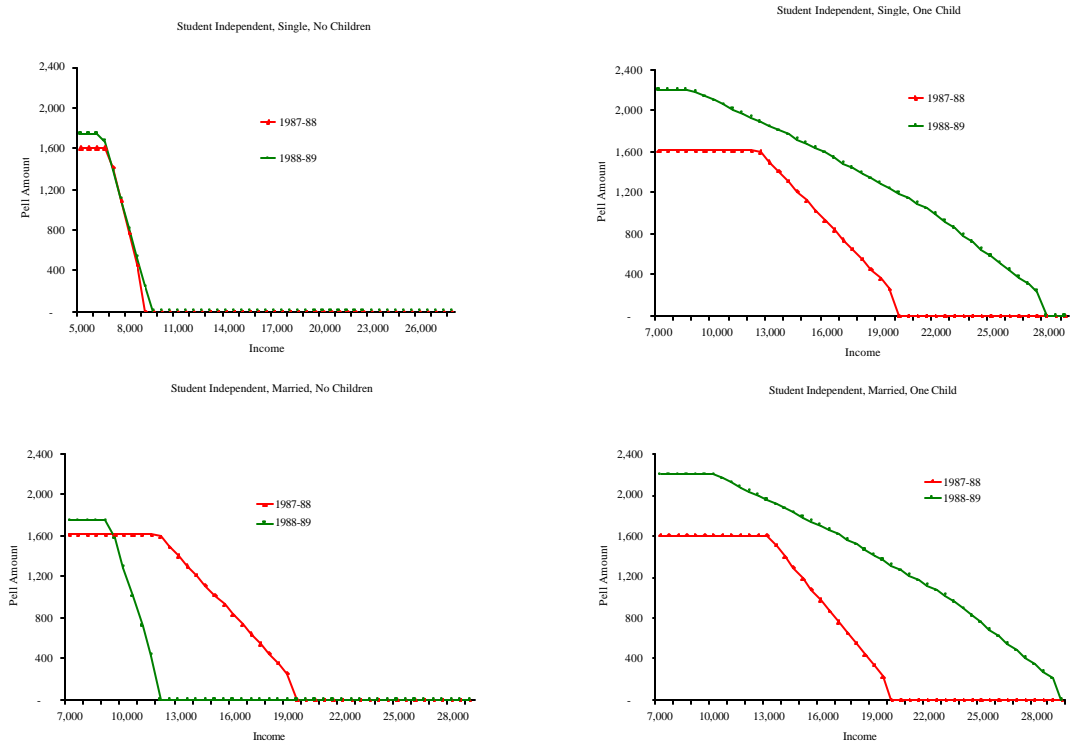
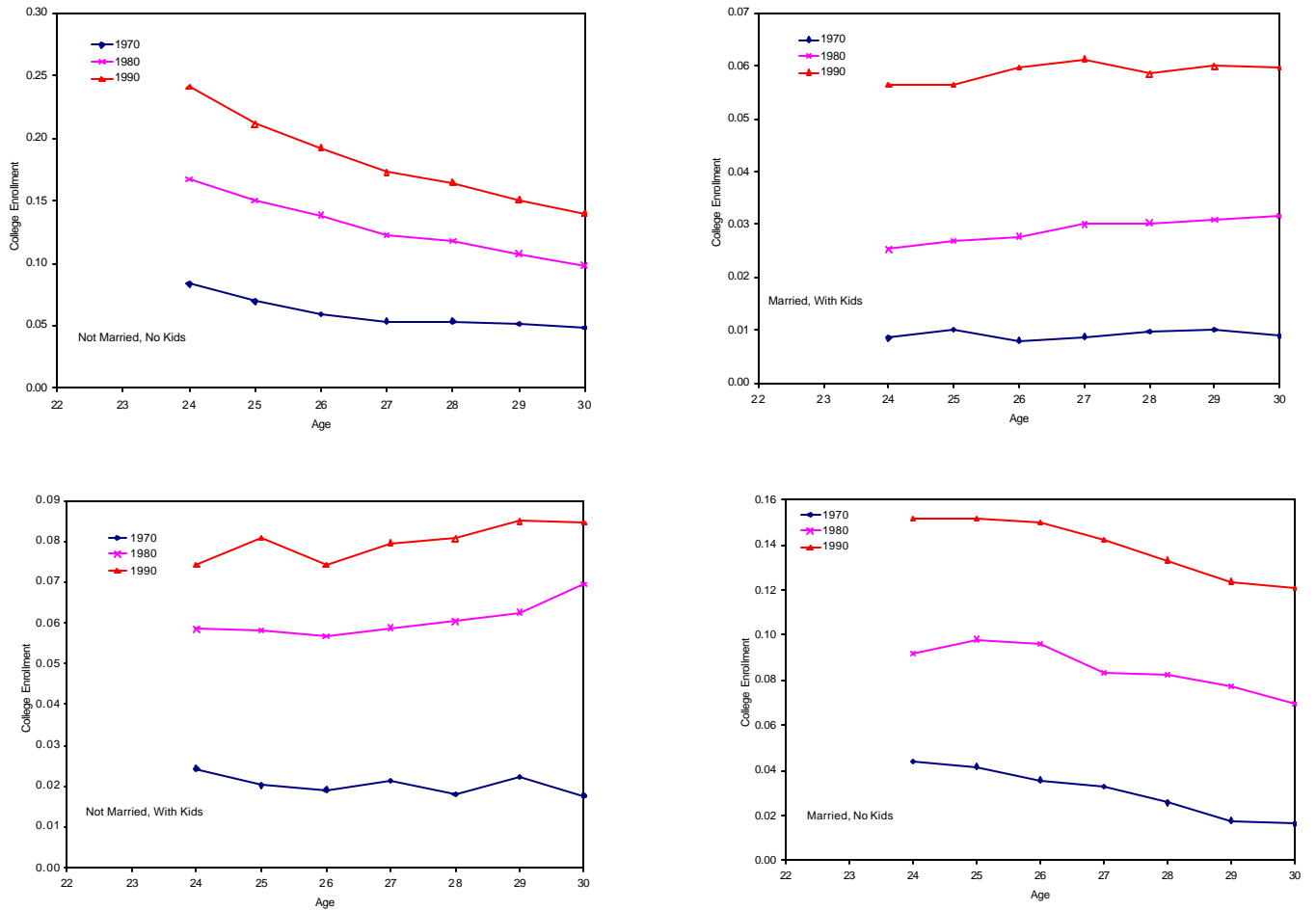


Figure 2: College enrollment rates of women ages 24-30



Notes: Data are from authors tabulations using the 1970 (3%), 1980 (5%), and 1990 (5%) Decennial Census files available through IPUMS.