Borrowing Trouble?
Student Loans, the Cost of Borrowing, and Implications for the Effectiveness of Need-Based Grant Aid

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University of Illinois             University of Maryland

March 19, 2015
Motivation

- Large (and growing) subsidies provided to college students
  - Pell Grants: $31b, Direct Loans to undergrads: $54b (2013-14)
  - Overlapping eligibility
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• Varying evidence of effectiveness of individual programs
  – Pell Grant aid (Kane, 1995; Bettinger, 2004; Bettinger et al., 2012)
  – State grant aid (many)
  – Access to federal loans (Dunlop, 2013; Wiederspan, 2015)
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  – State grant aid (many)
  – Access to federal loans (Dunlop, 2013; Wiederspan, 2015)

• Growing focus on how “nudges” affect student behavior
  – Number of free ACT score reports (Pallais, 2015)
  – Tuition waiver versus loan forgiveness (Field, 2009)
  – This paper: how institutions inform students of their loan eligibility
Loan Packaging

• Institutional discretion over loan amounts listed on students’ financial aid award letters (Scott-Clayton, 2013)
  – Almost all four-year institutions “package the max”
## Tuition Breakdown

<table>
<thead>
<tr>
<th>Estimated Cost of Attendance</th>
<th>$23,243 per year</th>
</tr>
</thead>
<tbody>
<tr>
<td>Costs* Direct Costs</td>
<td>Indirect Costs</td>
</tr>
<tr>
<td>Tuition and fees</td>
<td>6,593</td>
</tr>
<tr>
<td>Housing and meals</td>
<td>14,400</td>
</tr>
<tr>
<td>Estimated books and supplies</td>
<td>1,200</td>
</tr>
<tr>
<td>Estimated transportation</td>
<td>600</td>
</tr>
<tr>
<td>Estimated other educational costs</td>
<td>450</td>
</tr>
</tbody>
</table>

*Costs will vary based on enrollment status

## Grants and Aid Breakdown

### Grants and Scholarships Offered — Estimated Gift Aid

Total Grants and Scholarships (No payment required) | $7,600 per year

<table>
<thead>
<tr>
<th>Term 1</th>
<th>Term 2</th>
<th>Term 3</th>
<th>Total</th>
</tr>
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<tbody>
<tr>
<td>Institutional (SUNY School) Grant</td>
<td>500</td>
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</tr>
<tr>
<td>TAP</td>
<td>1,000</td>
<td>1,000</td>
<td>50</td>
</tr>
<tr>
<td>PELL</td>
<td>1,725</td>
<td>1,725</td>
<td>50</td>
</tr>
<tr>
<td>SEOG</td>
<td>250</td>
<td>250</td>
<td>50</td>
</tr>
<tr>
<td>SUNY Tuition Credit</td>
<td>75</td>
<td>75</td>
<td>50</td>
</tr>
<tr>
<td>Other scholarships</td>
<td>100</td>
<td>100</td>
<td>50</td>
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## Cost

<table>
<thead>
<tr>
<th>Estimated Remaining Cost After Grants and Scholarships</th>
</tr>
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<tr>
<td>Net Cost</td>
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## Loan Breakdown

### Loans Offered

Total Loans (Repayment Required) | $5,500 per year

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<tr>
<td>Federal Direct Subsidized Loan</td>
<td>1,550</td>
<td>1,250</td>
<td>700</td>
<td>3,500</td>
</tr>
<tr>
<td>Federal Direct Unsubsidized Loan</td>
<td>1,000</td>
<td>950</td>
<td>50</td>
<td>2,000</td>
</tr>
</tbody>
</table>

*NOTE: You can borrow less than the recommended loan offer

## Work Study

### Federal Work-Study (FWS)

FEDERAL WORK-STUDY | $1,203 per year

## Family Options

<table>
<thead>
<tr>
<th>FAFSA Calculated Expected Family Contribution (EFC)</th>
<th>$2,030 per year</th>
</tr>
</thead>
<tbody>
<tr>
<td>Options to Replace Expected Family Contribution or Net Cost</td>
<td></td>
</tr>
<tr>
<td>* Private payment plan offered by the college</td>
<td></td>
</tr>
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## Loan Default Rate

Percentage of borrowers entering repayment and defaulting on their loan:

- SUNY School: 6%
- Comparable Institutions: 12%

## Graduation Rate

Percentage of full-time students who graduate within 6 years: 71%

## Median Borrowing

Students at [school name] typically borrow $[x.xx] in Federal loans over [x] years.

- Your borrowing may be different.

## Repaying Your Loans

To learn more about loan repayment choices and work out your Federal Loan monthly payment, go to:

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### Cost

| Net Cost | $15,643 per year |

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### Work Study

| Federal Work-Study (FWS)          | $1,203 per year |

### Family Options

- **FAFSA Calculated Expected Family Contribution (EFC)**: $2,030 per year
- Options to Replace Expected Family Contribution or Net Cost
  - *Private payment plan offered by the college*
Loan Packaging

- Institutional discretion over loan amounts listed on students’ financial aid award letters (Scott-Clayton 2013)
  - Almost all four-year institutions “package the max”
  - Many community colleges do not package loans
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<td><strong>Academic Year</strong></td>
</tr>
<tr>
<td><strong>Student</strong></td>
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Los Angeles Mission College  
JOE TEST STUDENT  
Year: 2013-2014

**Award process date:** 6/1/2013  
**ISIR Transaction Number:** 03

*** Cost of Attendance ***
- **Tuition and fees:** $1,218
- **Books and Supplies:** $1,710
- **Room and Board:** $4,518
- **Transportation:** $1,179
- **Personal Expense:** $3,096
- **Dependent Care:** $0

--- **Total Cost of Attendance:** $11,721

*** Resources ***
- **Expected Family Contribution:** $0
- **Other Outside Aid:** $0

--- **Total Resources:** $0
--- **Estimated Need:** $11,721

*** Financial Aid Awards ***
- **Pell Grant:** $5,635
- **BOGG - Board of Gov Fee Waiver:** $936
- **Cal Grant B:** $1,473
- **Federal Work Study:** $2,000

--- **Total Financial Aid:** $10,044
--- **Unmet Need:** $1,677
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• Why might loan packaging practices matter?
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  – Students attending “nonpackaging” schools need to take additional steps before being able to borrow (loan request form, other requirements)
  – Complexity at other points in financial aid application process significantly reduces enrollment (Bettinger et al. 2012)
From New America Foundation’s “Why Student Loans are Different”

For me they had a check mark for whatever you can’t pay through scholarship or grant, do you want this to go to a loan? And I just checked yes. It was so easy, it was just one check mark.
Overview

1. Describe loan packaging practices within ~600 largest community colleges
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   - As a result of this interaction, grant aid may reduce some students educational attainment
Overview

3. Estimate the impact of need-based grant aid on educational investment decisions (borrowing and attainment)

- CUNY as a case study
- Identification: regression discontinuity (RD) and kink (RK) designs
- Grant aid reduces borrowing, has no impact on attainment
- Crowd-out exceeds 100 percent for borrowers
- Suggestive evidence that students induced to stop borrowing by fixed cost have lower attainment

4. Quantify importance of fixed cost for CUNY students' borrowing decisions
- Relaxing fixed cost leads to >250 percent increase in borrowing
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Packaging Practices and Potential Consequences
Community College Packaging Practices

• Collected information on packaging practices of community colleges that participate in federal loan programs with enrollment ≥ 2,500
  – Emails, phone calls, websites
  – Detailed information from 703 schools (94 percent)
## Community College Loan Packaging Procedures

<table>
<thead>
<tr>
<th></th>
<th>(1) Both</th>
<th>(2) Subsidized</th>
<th>(3) Neither</th>
</tr>
</thead>
<tbody>
<tr>
<td>Number of institutions</td>
<td>280</td>
<td>16</td>
<td>407</td>
</tr>
<tr>
<td>Average undergraduate enrollment</td>
<td>16,038</td>
<td>21,602</td>
<td>12,410</td>
</tr>
<tr>
<td>Enrollment weighted percent of institutions</td>
<td>0.45</td>
<td>0.04</td>
<td>0.51</td>
</tr>
<tr>
<td>Pell Grant aid</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Percent</td>
<td>0.40</td>
<td>0.35</td>
<td>0.37</td>
</tr>
<tr>
<td>Average</td>
<td>receipt</td>
<td>$3,659</td>
<td>$3,789</td>
</tr>
<tr>
<td>Federal loan aid</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Percent</td>
<td>0.29</td>
<td>0.26</td>
<td>0.16</td>
</tr>
<tr>
<td>Average</td>
<td>receipt</td>
<td>$5,330</td>
<td>$4,217</td>
</tr>
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Potential Consequences of Packaging Practices

• Simple two-period model
  – Attend school (first period), work (second period)
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    • Why? FAFSA complexity (Dynarski and Scott-Clayton 2006; Bettinger et al. 2012; Dynarski and Wiederspan 2012)
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- **Upon receiving financial aid package, students decide**
  - How many credits to take, how much to borrow
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• Listed loan amount serves as a recommendation
  – Students face a fixed cost of deviating from this recommendation
Potential Consequences of “Packaging $0”

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Full model  Budget Constraint
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  - For some students (“switchers”), desired loans fall below threshold
  - When threshold is high, small increases in grant aid will cause large reductions in borrowing => crowd-out > 100%
  - Could lower educational attainment through a reduction in resources
Model Predictions:
Impacts of Exogenous Increase in Grant Aid

1. Borrowing
   • Pell Grant aid crowds-out >100% of loans for “switchers”

2. Attainment
   • Marginal increase in grant aid → reduction in attainment for “switchers”
   • Marginal increase in grant aid → increase in attainment for students constrained by the fixed cost
   • Overall impact on attainment ambiguous
Case Study
City University of New York System

- Largest public urban university system in the U.S.
  - 17 two- and four-year schools, ~250,000 undergraduates/year
- Needy students, limited institutional aid
  - Most students receive Pell Grant aid
- Low tuition + generous state grant aid program (TAP)
  - $5000 (4-year) or $2800 (2-year) in 2009
- Low graduation rates
  - 15% of AA students graduated within 4 years
  - 41% of BA students graduated within 6 years
- Broadly representative of Pell Grant recipients attending public institutions nationwide

Comparison
Federal Student Aid

- **Free Application for Federal Student Aid (FAFSA)**
  - Determines eligibility for Pell Grant aid, subsidized loans
  - Inputs: family income, assets, structure, etc.
  - Output: EFC
Financial Aid Packaging

- Prospective students list up to 10 schools (most only list 1)
- Institutional financial aid offices calculate FSA eligibility
- Package includes grants (federal, state, institutional) and loan aid recommendations
- Subsidized loan eligibility depends on need:
  \[ \text{Need} = \text{Cost of attendance} - \text{EFC} - \text{grant} \]
- All students eligible for unsubsidized loans

Pell Grant aid is a function of the maximum award and EFC

Timeline
Loan Application
Award Letter
Sample

- Seven cohorts of first-time, degree-seeking students
  - 2004-05 through 2010-11
  - FAFSA data, demographics, and educational outcomes
- Focus on years in which we observe financial aid outcomes
  - 2007 through 2011
  - 1st through 3rd year students
- Eliminate students ineligible for Pell Grant aid
  - Non-citizens (~6%)
- Focus on students “near” the Pell Grant eligibility threshold
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- Limitations
  - Only observe borrowing and attainment of enrolled students
  - Limited information on employment, other sources of debt
## Sample Characteristics: Cost of Attendance & Financial Aid

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<thead>
<tr>
<th></th>
<th>Ineligible</th>
<th>Eligible</th>
</tr>
</thead>
<tbody>
<tr>
<td>Total need (= Cost of attendance - EFC)</td>
<td>$6,800</td>
<td>$10,400</td>
</tr>
<tr>
<td>Total grant aid</td>
<td>$1,000</td>
<td>$4,300</td>
</tr>
<tr>
<td>Unmet need</td>
<td>$5,800</td>
<td>$6,100</td>
</tr>
<tr>
<td>Any borrowing?</td>
<td>0.24</td>
<td>0.07</td>
</tr>
<tr>
<td>Total loan aid</td>
<td>$920</td>
<td>$240</td>
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Identification of the Impact of Pell Grant aid on Borrowing and Attainment: RD and RK Designs

- Underlying relationship: \( Y = \tau P_{e ll} + g(EFC) + U \)
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  – Guarantees independence of \( U \) and \( Pell \)
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  - Guarantees independence of \( U \) and \( Pell \)
- Second best solution: use nonlinearities in Pell Grant formula to compare students that are as good as randomly assigned to varying amounts of Pell Grant aid
The Empirical Distribution of Pell Grant Aid
Discontinuity in the Level of Pell Grant Aid
Discontinuity in the Level of Pell Grant Aid

\[ \tau_{RD} = \lim_{{\epsilon \uparrow 0}} \frac{[Y|EFC = ec_0 + \epsilon] - \lim_{{\epsilon \downarrow 0}} [Y|EFC = ec_0 + \epsilon]}{\lim_{{\epsilon \uparrow 0}} [Pell|EFC = ec_0 + \epsilon] - \lim_{{\epsilon \downarrow 0}} [Pell|EFC = ec_0 + \epsilon]} = \tau \]
Discontinuity in the Relationship between Pell Grant Aid and Need

\[ \frac{\partial \text{Pell}(EFC)}{\partial EFC} = -1 \]

\[ \frac{\partial \text{Pell}(EFC)}{\partial EFC} = 0 \]
Discontinuity in the Relationship between Pell Grant Aid and Need

\[
\tau_{RK} = \frac{\lim_{\varepsilon \to 0} \left[ \frac{\partial Y|EFC=e_{0}+\varepsilon}{\partial e_{0}} \right]}{\lim_{\varepsilon \to 0} \left[ \frac{\partial \text{Pell}|EFC=e_{0}+\varepsilon}{\partial e_{0}} \right]} - \frac{\lim_{\varepsilon \to 0} \left[ \frac{\partial Y|EFC=e_{0}+\varepsilon}{\partial e_{0}} \right]}{\lim_{\varepsilon \to 0} \left[ \frac{\partial \text{Pell}|EFC=e_{0}+\varepsilon}{\partial e_{0}} \right]} = \tau
\]
Identification: RD and RK Designs

- Underlying relationship: \( Y = \tau \text{Pell} + g(EFC) + U \)
- Identification from nonlinearities in Pell Grant formula

- Identifying assumption: no manipulation
  - Students/families have imperfect control over \( EFC \)
Identification: RD and RK Designs

• Underlying relationship: $Y = \tau Pell + g(EFC) + U$

• Identification from nonlinearities in Pell Grant formula

• Identifying assumption: no manipulation
  – Students/families have imperfect control over $EFC$

• Not testable, but generates testable implications:
  – Continuous number of students on either side of threshold
  – Continuous distribution of observable characteristics
  – Continuous differentiability in both
RD/RK Testable Implications: Smooth Density wrt EFC

![Graph showing the relationship between distance from Pell Grant eligibility threshold and number of applications compared to the probability of enrollment.](image-url)
The Impact of Pell Grant Aid on Borrowing
### Borrowing: 2SLS Estimates

<table>
<thead>
<tr>
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<th>First-year</th>
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<tbody>
<tr>
<td>Pell Grant Aid</td>
<td>-0.428</td>
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<td></td>
<td>(0.092)**</td>
<td>(0.171)**</td>
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Note: RF Estimates
## Borrowing: 2SLS Estimates

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**Borrowing: 2SLS Estimates**

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**Interpretation:**

Every dollar of Pell Grant aid leads to a ~$0.43 decrease in student loan aid.
### Borrowing: 2SLS Estimates

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Robust to:
- Varying bandwidths and polynomials
- Using only the kink or discontinuity as instruments
- Accounting for changes in institutional grant aid
- Accounting for mechanical change in subsidized loan eligibility
- Excluding covariates
### Borrowing: 2SLS Estimates

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**Interpretation:**
Students make schooling decisions *before* learning about their Pell Grant award.
## Borrowing: 2SLS Estimates

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**Interpretation:**

Students who do not face borrowing constraints should respond to Pell Grant aid by reducing loans.
## Borrowing: 2SLS Estimates

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**Interpretation:**

Less than 1% of students fully exhaust federal loan eligibility.
Borrowing: 2SLS Estimates

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Interpretation:
Less than 1% of students fully exhaust federal loan eligibility.
Very few students constrained in traditional sense.
## Borrowing: 2SLS Estimates

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However…

Less than 24% of Pell Grant-ineligible students borrow
The Probability of Borrowing
### Borrowing: 2SLS Estimates

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However…

Less than 24% of Pell Grant-ineligible students borrow

Scaling estimates by “latent probability of borrowing”:

$1$ increase in Pell Grant aid $\rightarrow$ $\textbf{$1.80$}$ decrease in loans for borrowers and would-be borrowers
Borrowing: 2SLS Estimates

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With standard preferences and when the marginal cost of borrowing is continuous in debt, crowd-out should not exceed 100%
### Borrowing: 2SLS Estimates

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<td>H₀: crowd-out &gt; -1, p-value</td>
<td>0.002</td>
<td>&lt;0.001</td>
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With standard preferences and when the marginal cost of borrowing is continuous in debt, crowd-out should not exceed 100%
**Heterogeneity by Packaging: Evidence from the NPSAS:**

<table>
<thead>
<tr>
<th>Packages loans?</th>
<th>1. 2SLS Estimates</th>
<th>2. Crowd-out</th>
<th>would-be borrower</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>$Y$</td>
<td>$N$</td>
<td>$Y$</td>
</tr>
<tr>
<td>Pell Grant aid</td>
<td>-0.397</td>
<td>-0.605</td>
<td>-0.534</td>
</tr>
<tr>
<td></td>
<td>(0.123)**</td>
<td>(0.152)**</td>
<td>(0.159)**</td>
</tr>
<tr>
<td>H₀: crowd-out &gt; -1, $p$-value</td>
<td>--</td>
<td>--</td>
<td>--</td>
</tr>
<tr>
<td></td>
<td>[0.080]</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Observations</td>
<td>5,410</td>
<td></td>
<td>5,410</td>
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The Impact of Pell Grant Aid on Attainment
Impacts on Attainment

• Small, insignificant impacts on persistence, credits attempted, credits earned, GPA

• Can rule out impacts as small as $1000 in Pell Grant aid =>
  – 1 additional credit earned in first year (<6% increase)
  – 2.6 additional credits by end of third year (<6% increase)
Impacts on Attainment

• Small, insignificant impacts on persistence, credits attempted, credits earned, GPA

• Can rule out impacts as small as $1000 in Pell Grant aid =>
  – 1 additional credit earned in first year (<6% increase)
  – 2.6 additional credits by end of third year (<6% increase)

• Two interpretations:
  – Pell Grant aid does not increase attainment of students near the eligibility threshold
  – Opposite and offsetting impacts
    • Reduces attainment when fixed cost is binding
    • Increases attainment of nonborrowers constrained by fixed cost

Parametric Specification
Point Estimates
### Impacts on Attainment: Fixed Effects Models

<table>
<thead>
<tr>
<th>Pell Grant Aid ($1k)</th>
<th>(1) Credits attempted</th>
<th>(2) Credits Earned</th>
</tr>
</thead>
<tbody>
<tr>
<td>x 1[No loans]</td>
<td>0.457</td>
<td>0.395</td>
</tr>
<tr>
<td></td>
<td>(0.214)*</td>
<td>(0.225)+</td>
</tr>
<tr>
<td>x 1[Any loans]</td>
<td>0.285</td>
<td>0.225</td>
</tr>
<tr>
<td></td>
<td>(0.198)</td>
<td>(0.208)</td>
</tr>
<tr>
<td>1[No loans]</td>
<td>-1.820</td>
<td>-1.014</td>
</tr>
<tr>
<td></td>
<td>(0.189)**</td>
<td>(0.194)**</td>
</tr>
<tr>
<td>Observations</td>
<td>48,496</td>
<td>48,496</td>
</tr>
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</table>
Characterizing the Fixed Cost of Borrowing
How Important is the Fixed Cost?

- To quantify the importance of the fixed cost faced by CUNY students, we model the impact of removing it on borrowing...
Modeling Borrowing Thresholds

- Treat borrowing thresholds $d$ as random effects: $d_i \sim F(d_i, \theta_d)$
  - Similar to Tobit model except censoring varies across individuals

- Latent desired debt: $d_{it}^* = X_{it} \beta + e_{it}$

- Observed debt:
  
  $d_{it} = 0 \quad \text{if} \quad d_{it}^* < d_{it}$
  
  $d_{it} \in \{d_{it}^*, d_{it}^{max}\} \quad \text{if} \quad d_{it}^* \geq d_{it}$
Estimating Borrowing Thresholds

- Assume exponential distribution of thresholds:
  \[ F(d_i, \theta_d) = 1 - e^{-\lambda d_i} \]

- Assume normal distribution of desired amount:
  \[ G(e_{it}, \theta_e) = N(0, \sigma^2) \]

- Covariates include quadratic in EFC, subset of controls, and \( \text{Pell}_{it} \), estimated using kink and discontinuity instruments

- Focus on subsidized loans and students eligible to borrow at the subsidized maximum
Predicted Borrowing: No Fixed Cost
## Observed and Counterfactual Borrowing: First-Year Students

<table>
<thead>
<tr>
<th></th>
<th>Empirical Moments</th>
<th>Counterfactual: No Fixed Cost of Borrowing</th>
<th>Percentage Change</th>
</tr>
</thead>
<tbody>
<tr>
<td>Share Borrowing</td>
<td>0.147</td>
<td>0.598</td>
<td>306%</td>
</tr>
<tr>
<td>Mean Loan</td>
<td>Borrowing</td>
<td>$1,767</td>
<td>$1,619</td>
</tr>
<tr>
<td>Unconditional Mean Loan</td>
<td>$260</td>
<td>$968</td>
<td>272%</td>
</tr>
</tbody>
</table>
Ongoing and Future Research
Remaining Questions

• Beyond interactions with Pell Grant aid, how do packaging practices affect outcomes?
  – Potentially over- and under-borrowing
  – Set of experiments at 3 community colleges involving loan packaging
  – Simple worksheet + “fill in the blank” as treatment arm

• How do students trade-off between federal loans and other sources of debt/employment while in school?
  – Private loans, credit card debt?
  – Full-time versus part-time employment?

• What are the short- and long-run impacts of loan aid?
  – Does loan aid increase attainment in the short-run?
  – Distortions to long-run financial decisions (family formation, homeownership)?
Conclusions

• Loan packaging practices have important implications for the effectiveness of grant aid and educational attainment
  – Among borrowers, each $1 of Pell Grant aid leads to a greater than $1 reduction in federal loan aid
  – A marginal increase in Pell Grant aid reduces total resources when students face a fixed cost of deviating from “recommended” loan
  – Suggestive evidence that these students attempt and earn fewer credits
  – Relaxing fixed cost → over 250 percent increase in borrowing

• Welfare implications?
  – Depend on 1) impact of student loan aid on educational attainment and 2) whether student loan debt distorts postsecondary decisions
Thank You!
Supplemental Slides
Borrowing With a Fixed Cost

- **Standard two-period model**
  - First period: choose schooling and debt to maximize lifetime utility
  - Second period: work and repay debt
  - Potential credit constraint due to borrowing limits
Borrowing With a Fixed Cost

- **Standard two-period model**
  - First period: choose schooling and debt to maximize lifetime utility
  - Second period: work and repay debt
  - Potential credit constraint due to borrowing limits

- **Our modification**
  - Fixed cost of borrowing (e.g., time, deviating from default offer)
  - Generates a discontinuity in the marginal cost of borrowing
  - Creates threshold debt $d$ below which students will not borrow
Borrowing With a Fixed Cost

- Students choose schooling and debt to maximize lifetime utility: \( U = u(c_0) + \beta u(c_1) \)
Borrowing With a Fixed Cost

• Students choose schooling and debt to maximize lifetime utility: \( U = u(c_0) + \beta u(c_1) \)

  - First period budget constraint:

\[
c_0 \leq \omega + EFC + g + d - C(s) - \gamma \cdot \kappa_0
\]
Borrowing With a Fixed Cost

- Students choose schooling and debt to maximize lifetime utility: \( U = u(c_0) + \beta u(c_1) \)
  - First period budget constraint:
    \[
    c_0 \leq \omega + EFC + g + d - C(s) - \gamma \cdot \kappa_0
    \]
    Error term in govt’s estimation of family resources
Borrowing With a Fixed Cost

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  - First period budget constraint:
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    \]
    (Exogenous) grant aid
Borrowing With a Fixed Cost

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    \]
    Debt
Borrowing With a Fixed Cost

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  - First period budget constraint:
    \[
    c_0 \leq \omega + EFC + g + d - C(s) - \gamma \cdot \kappa_0
    \]

  Cost of schooling
• Students choose schooling and debt to maximize lifetime utility: $U = u(c_0) + \beta u(c_1)$
  
  First period budget constraint:
  
  $c_0 \leq \omega + EFC + g + d - C(s) - \gamma \cdot \kappa_0$

  Fixed cost of incurring debt $d > 0 \quad 1[d > 0]$
Borrowing With a Fixed Cost

- Students choose schooling and debt to maximize lifetime utility: \( U = u(c_0) + \beta u(c_1) \)
  - First period budget constraint:
    \[ c_0 \leq \omega + EFC + g + d - C(s) - \gamma \cdot \kappa_0 \]
  - Second period budget constraint:
    \[ c_1 \leq w(s) - Rd \]
Borrowing With a Fixed Cost

- Students choose schooling and debt to maximize lifetime utility: $U = u(c_0) + \beta u(c_1)$
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  - Second period budget constraint:
    $$c_1 \leq w(s) - Rd$$

Earnings    Interest rate
Borrowing With a Fixed Cost

• Students choose schooling and debt to maximize lifetime utility:

$$\max_{s,d} \left\{ u (\omega + EFC + g + d - C(s) - \gamma \cdot \kappa_0) + \beta u (w(s) - R \bar{d}) + \lambda \left( \bar{d} - \bar{d} \right) \right\}$$
Borrowing With a Fixed Cost

- Students choose schooling and debt to maximize lifetime utility:

\[ C'(s) u'(c_0) = \beta w'(s) u'(c_1) \]
\[ u'(c_0) = \beta R u'(c_1) + \lambda \]
\[ d = \ddot{d} \]
Budget Set

- \( c_0(0) \)
- \( c_0(d_{\text{max}}) \)
- \( c_0(\bar{d}) \)
Budget Set

\[ c_1 \]

\[ c_1(0) \]

\[ c_0(0) \]

\[ c_0(d_{\text{max}}) \]

\[ c_0(\bar{d}) \]

savers

borrowers
Budget Set

- savers
- borrowers
- subsidized loan maximum
- federal loan maximum
Budget Set

savers

borrowers

discontinuity due to fixed cost

subsidized loan maximum

federal loan maximum
Inframarginal Borrowers
Inframarginal Borrowers
Inframarginal Borrowers

c_1

\( c_1(0) \)

\( c_1(d^*) \)

\( c_0(0) \)

\( c_0(d^*) \)

\( c_0(d_{s_{\text{max}}}) \)

\( c_0(d) \)

\( d^* \)
Inframarginal Borrowers

c_1

\[ c_1(0) \]

\[ c_1(d^*) \]

\[ c_1(d^{*''}) \]

\[ c_0(0) \]

\[ c_0(d^*) \]

\[ c_0(d_{max}) \]

\[ c_0(d) \]

\[ d^* \]

\[ d^{*'} \]
Inframarginal Borrowers

\[ \frac{\partial d^*}{\partial g} \in (-1, 0) \]
Inframarginal Borrowers

\[
\frac{\partial d^*}{\partial g} \in (-1, 0)
\]

\[
\frac{\partial s^*}{\partial g} = 0
\]
“Threshold” Non-Borrowers

\[ c_1(0) \]

\[ c_0(0) \]

\[ c_0(d_{\text{max}}) \]

\[ c_0(\overline{d}) \]
"Threshold" Non-Borrowers

\[ \frac{\partial d^*}{\partial g} = 0 \]

\[ \frac{\partial s^*}{\partial g} > 0 \]
Marginal Borrowers
Marginal Borrowers

\[
\frac{\Delta d^*}{\Delta g} = \frac{0-d}{\Delta g} < -1
\]

\[
\frac{\Delta s^*}{\Delta g} = \frac{s_0-s}{\Delta g} < 0
\]
RD/RK Testable Implications: Smooth Distribution of Predetermined Observable Characteristics

B. White

Graph showing the relationship between the percentage of white students (Pct White) and the distance to Pell Grant eligibility threshold. The graph indicates a smooth distribution over the range of distances.
RD/RK Testable Implications: Smooth Distribution of Predetermined Observable Characteristics

D. SAT Score
RD/RK Testable Implications: Smooth Distribution of Predetermined Observable Characteristics

C. Adjusted Gross Income

Distance to Pell Grant Eligibility Threshold

AGI

80,000
70,000
60,000
50,000
40,000
30,000
-4000
-3000
-2000
-1000
0
1000
2000
3000
4000
Timeline

• Submit CUNY application
  – Rank institutions, choose attendance intensity (full-time vs. part-time)
  – By February 1st for guaranteed consideration

• Submit FAFSA
  – Requires information on prior-year taxable income
  – Most students submit in March or later
  – Immediately learn EFC

• Admissions decisions + financial aid package
  – Students choose how much to borrow
  – Default loan offer in CUNY system = $0
Applicants and Enrollment

• An additional $1000 of Pell Grant aid => 0.3 percentage point increase in the probability of enrollment (insignificant)

• We can rule out impacts:
  – Greater than an 0.8 percentage point (4.5 percent) increase in the probability of enrollment
  – Smaller than a -0.3 percentage point (1.9 percent) decrease in the probability of enrollment
Parametric RD/RK Estimation

(FS)

\[ P_{ell_{ist}} = f \left( \overline{EFC}_{it} \right) + \beta_1 1 \left[ \overline{EFC}_{it} < 0 \right] + \beta_2 \overline{EFC}_{it} \times 1 \left[ \overline{EFC}_{it} < 0 \right] + \eta X_{it} + \delta_s + \delta_c + \nu_{ist} \]

(RF)

\[ Y_{ist} = g \left( \overline{EFC}_{it} \right) + \pi_1 1 \left[ \overline{EFC}_{it} < 0 \right] + \pi_2 \overline{EFC}_{it} \times 1 \left[ \overline{EFC}_{it} < 0 \right] + \phi X_{it} + \alpha_s + \alpha_c + \epsilon_{ist} \]

\[ \hat{\tau}_{RD} = \frac{\hat{\pi}_1}{\hat{\beta}_1} \]
Parametric RD/RK Estimation

(FS)

\[ P_{ell_{ist}} = f \left( \overline{EFC}_{it} \right) + \beta_1 1 \left( \overline{EFC}_{it} < 0 \right) + \beta_2 \overline{EFC}_{it} \times 1 \left( \overline{EFC}_{it} < 0 \right) + \eta X_{it} + \delta_s + \delta_c + \nu_{ist} \]

(RF)

\[ Y_{ist} = g \left( \overline{EFC}_{it} \right) + \pi_1 1 \left( \overline{EFC}_{it} < 0 \right) + \pi_2 \overline{EFC}_{it} \times 1 \left( \overline{EFC}_{it} < 0 \right) + \phi X_{it} + \alpha_s + \alpha_c + \epsilon_{ist} \]

\[ \hat{\tau}_{RK} = \frac{\hat{\pi}_2}{\hat{\beta}_2} \]
Parametric RD/RK Estimation

(FS)

\[ P_{ell_{ist}} = f(\hat{EFC}_{it}) + \beta_1 1 \left( \hat{EFC}_{it} < 0 \right) + \beta_2 \hat{EFC}_{it} \times 1 \left( \hat{EFC}_{it} < 0 \right) + \eta X_{it} + \delta_s + \delta_c + \nu_{ist} \]

(RF)

\[ Y_{ist} = g(\hat{EFC}_{it}) + \pi_1 1 \left( \hat{EFC}_{it} < 0 \right) + \pi_2 \hat{EFC}_{it} \times 1 \left( \hat{EFC}_{it} < 0 \right) + \phi X_{it} + \alpha_s + \alpha_c + \epsilon_{ist} \]

In practice, use both kink and discontinuity as instruments (Dong 2012):

\[ \hat{T}_{RD,RK} = \frac{\hat{\pi}_1 + w\hat{\pi}_2}{\hat{\beta}_1 + w\hat{\beta}_2} \]
RD/RK Testable Implications: Smooth Density wrt EFC
## Sample Characteristics: Demographics

<table>
<thead>
<tr>
<th></th>
<th>Ineligible</th>
<th>Eligible</th>
</tr>
</thead>
<tbody>
<tr>
<td>Dependent student</td>
<td>0.91</td>
<td>0.90</td>
</tr>
<tr>
<td>Race = white</td>
<td>0.30</td>
<td>0.19</td>
</tr>
<tr>
<td>SAT percentile</td>
<td>0.39</td>
<td>0.32</td>
</tr>
<tr>
<td>Foreign-born</td>
<td>0.15</td>
<td>0.19</td>
</tr>
<tr>
<td>Foreign-born parent(s)</td>
<td>0.41</td>
<td>0.47</td>
</tr>
<tr>
<td>Parents' highest education = college</td>
<td>0.53</td>
<td>0.54</td>
</tr>
<tr>
<td>Initial Degree Program = BA</td>
<td>0.44</td>
<td>0.35</td>
</tr>
</tbody>
</table>
Reduced Form QTE Estimates

A. First Year Students
## Reduced Form Impacts of Pell Grant Eligibility and Generosity on Borrowing

<table>
<thead>
<tr>
<th></th>
<th>First-year</th>
<th>Returning</th>
</tr>
</thead>
<tbody>
<tr>
<td>Pell Grant Eligible</td>
<td>-224.45</td>
<td>-273.99</td>
</tr>
<tr>
<td></td>
<td>(53.76)**</td>
<td>(55.88)**</td>
</tr>
<tr>
<td>× Distance from Threshold</td>
<td>0.295</td>
<td>0.335</td>
</tr>
<tr>
<td></td>
<td>(0.075)**</td>
<td>(0.073)**</td>
</tr>
<tr>
<td>Observations</td>
<td>38,100</td>
<td>46,744</td>
</tr>
</tbody>
</table>
## Robustness to Varying Bandwidths and Polynomials: 1st Year Students

<table>
<thead>
<tr>
<th>Bandwidth:</th>
<th>$4,000</th>
<th>$3,000</th>
<th>$2,000</th>
<th>$1,000</th>
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</thead>
<tbody>
<tr>
<td>Polynomial of order:</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>One</td>
<td>-0.134</td>
<td>-0.187</td>
<td>-0.320</td>
<td>-0.665</td>
</tr>
<tr>
<td></td>
<td>(0.023)**</td>
<td>(0.037)**</td>
<td>(0.057)**</td>
<td>(0.142)**</td>
</tr>
<tr>
<td></td>
<td>[0.000]</td>
<td>[0.000]</td>
<td>[0.038]</td>
<td>[0.601]</td>
</tr>
<tr>
<td>Two</td>
<td>-0.428</td>
<td>-0.557</td>
<td>-0.706</td>
<td>-0.684</td>
</tr>
<tr>
<td></td>
<td>(0.092)**</td>
<td>(0.109)**</td>
<td>(0.169)**</td>
<td>(0.247)**</td>
</tr>
<tr>
<td></td>
<td>[0.116]</td>
<td>[0.867]</td>
<td>[0.875]</td>
<td>[0.779]</td>
</tr>
<tr>
<td>Three</td>
<td>-0.599</td>
<td>-0.814</td>
<td>-0.795</td>
<td>-0.771</td>
</tr>
<tr>
<td></td>
<td>(0.148)**</td>
<td>(0.209)**</td>
<td>(0.243)**</td>
<td>(0.327)*</td>
</tr>
<tr>
<td></td>
<td>[0.442]</td>
<td>[0.682]</td>
<td>[0.959]</td>
<td>[0.778]</td>
</tr>
<tr>
<td>Four</td>
<td>-0.910</td>
<td>-0.748</td>
<td>-0.773</td>
<td>-1.110</td>
</tr>
<tr>
<td></td>
<td>(0.231)**</td>
<td>(0.254)**</td>
<td>(0.294)**</td>
<td>(0.392)**</td>
</tr>
<tr>
<td></td>
<td>[0.930]</td>
<td>[0.987]</td>
<td>[0.992]</td>
<td>[0.999]</td>
</tr>
<tr>
<td>Optimal Order</td>
<td>2</td>
<td>1</td>
<td>1</td>
<td>2</td>
</tr>
<tr>
<td>Observations</td>
<td>38,100</td>
<td>25,613</td>
<td>15,645</td>
<td>7,523</td>
</tr>
</tbody>
</table>
Estimates from Local Linear Regressions: First-Year Students

<table>
<thead>
<tr>
<th></th>
<th>OLS</th>
<th>2SLS</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>(1) FS</td>
<td>(2) RF</td>
</tr>
<tr>
<td>Pell Grant eligible</td>
<td>378.10</td>
<td>-277.63</td>
</tr>
<tr>
<td></td>
<td>(26.520**)</td>
<td>(52.28)**</td>
</tr>
<tr>
<td>× Distance from threshold</td>
<td>-0.798</td>
<td>0.223</td>
</tr>
<tr>
<td></td>
<td>(0.014)**</td>
<td>(0.047)**</td>
</tr>
<tr>
<td>Pell Grant aid</td>
<td>-0.759</td>
<td>-0.275</td>
</tr>
<tr>
<td></td>
<td>(0.142)**</td>
<td>(0.058)**</td>
</tr>
<tr>
<td>Bandwidth</td>
<td>1,639</td>
<td>2,078</td>
</tr>
<tr>
<td>Observations</td>
<td>12,519</td>
<td>16,360</td>
</tr>
</tbody>
</table>

A. Imbens-Kalyanaraman Optimal Bandwidth
### Estimates from Local Linear Regressions: First-Year Students

<table>
<thead>
<tr>
<th></th>
<th>OLS</th>
<th>2SLS</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>(1) FS (2) RF (3) RD (4) RK (5) RD/RK</td>
<td></td>
</tr>
<tr>
<td><strong>B. Fan-Gijbels Rule of Thumb Bandwidth</strong></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Pell Grant eligible</td>
<td>379.20</td>
<td>-253.63</td>
</tr>
<tr>
<td></td>
<td>(25.52)**</td>
<td>(58.60)**</td>
</tr>
<tr>
<td>× Distance from threshold</td>
<td>-0.767</td>
<td>0.336</td>
</tr>
<tr>
<td></td>
<td>(0.013)**</td>
<td>(0.091)**</td>
</tr>
<tr>
<td>Pell Grant aid</td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td>-0.657</td>
<td>-0.429</td>
</tr>
<tr>
<td></td>
<td>(0.149)**</td>
<td>(0.114)**</td>
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<tr>
<td>Bandwidth</td>
<td>1,774</td>
<td>1,358</td>
</tr>
<tr>
<td>Observations</td>
<td>13,726</td>
<td>13,217</td>
</tr>
</tbody>
</table>

*OLS* and *2SLS* refer to ordinary least squares and two-stage least squares regression, respectively. Standard errors are reported in parentheses, with ** indicating significance at the 5% level.
## Estimates from Local Linear Regressions: First-Year Students

<table>
<thead>
<tr>
<th></th>
<th>OLS</th>
<th></th>
<th></th>
<th>2SLS</th>
<th></th>
<th></th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>(1) FS</td>
<td>(2) RF</td>
<td>(3) RD</td>
<td>(4) RK</td>
<td>(5) RD/RK</td>
<td></td>
</tr>
<tr>
<td><strong>C. Ludwig-Miller Cross Validation Bandwidth</strong></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Pell Grant eligible</td>
<td>451.50</td>
<td>-265.10</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td>(28.96)**</td>
<td>(53.44)**</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>× Distance from threshold</td>
<td>-0.329</td>
<td>0.229</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td>(0.122)**</td>
<td>(0.053)**</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Pell Grant aid</td>
<td></td>
<td></td>
<td></td>
<td>-0.720</td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td></td>
<td>(0.146)**</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Bandwidth</td>
<td>283</td>
<td>1,942</td>
<td>1,942</td>
<td>1,942</td>
<td>1,942</td>
<td>1,942</td>
</tr>
<tr>
<td>Observations</td>
<td>2,046</td>
<td>15,150</td>
<td>15,150</td>
<td>15,150</td>
<td>15,150</td>
<td>15,150</td>
</tr>
</tbody>
</table>
## Separate RD and RK Estimates

<table>
<thead>
<tr>
<th></th>
<th>First-year</th>
<th>Returning</th>
</tr>
</thead>
<tbody>
<tr>
<td>Pell Grant Aid (RD)</td>
<td>-0.577</td>
<td>-0.785</td>
</tr>
<tr>
<td></td>
<td>(0.138)**</td>
<td>(0.171)**</td>
</tr>
<tr>
<td>Pell Grant Aid (RK)</td>
<td>-0.387</td>
<td>-0.446</td>
</tr>
<tr>
<td></td>
<td>(0.098)**</td>
<td>(0.099)**</td>
</tr>
<tr>
<td>Test of equality (pval)</td>
<td>0.167</td>
<td>0.098</td>
</tr>
<tr>
<td>Observations</td>
<td>38,100</td>
<td>46,744</td>
</tr>
</tbody>
</table>
## Accounting for Other Grant Aid

<table>
<thead>
<tr>
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<th>First-year</th>
<th>Returning</th>
</tr>
</thead>
<tbody>
<tr>
<td>Pell + Other Grant Aid</td>
<td>-0.386</td>
<td>-0.523</td>
</tr>
<tr>
<td></td>
<td>(0.079)**</td>
<td>(0.097)**</td>
</tr>
<tr>
<td>Observations</td>
<td>38,100</td>
<td>46,744</td>
</tr>
</tbody>
</table>
## Eliminating Mechanical Effect on Subsidized Loan Eligibility

<table>
<thead>
<tr>
<th></th>
<th>First-year</th>
<th>Returning</th>
</tr>
</thead>
<tbody>
<tr>
<td>Pell Grant Aid</td>
<td>-0.373</td>
<td>-0.505</td>
</tr>
<tr>
<td></td>
<td>(0.117)**</td>
<td>(0.138)**</td>
</tr>
<tr>
<td>Observations</td>
<td>23,762</td>
<td>24,191</td>
</tr>
</tbody>
</table>
### No Covariates

<table>
<thead>
<tr>
<th></th>
<th>First-year</th>
<th>Returning</th>
</tr>
</thead>
<tbody>
<tr>
<td>Pell Grant Aid</td>
<td>-0.415</td>
<td>-0.540</td>
</tr>
<tr>
<td></td>
<td>(0.096)**</td>
<td>(0.099)**</td>
</tr>
<tr>
<td>Observations</td>
<td>38,100</td>
<td>46,744</td>
</tr>
</tbody>
</table>
Comparing CUNY Pell Grant Recipients with a Nationally Representative Sample: Grant Aid and Need
Comparing CUNY Pell Grant Recipients with a Nationally Representative Sample: Demographics

- **Student Race**: CUNY vs. NPSAS (Public Schools)
  - Female
  - Dependent
  - Black
  - Hispanic
  - White
  - High school
  - College

- **Parental Education**: Immigrant Status
  - 1st generation
  - 2nd generation
Comparing CUNY Pell Grant Recipients with a Nationally Representative Sample: Grant Aid and Need

- Federal subsidized loans
- Federal unsubsidized loans
- Private loans

$0, $200, $400, $600, $800, $1,000
# The Impact of Pell Grant Aid on Attainment

<table>
<thead>
<tr>
<th></th>
<th>First-year students</th>
<th>Returning students</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>(1) Current</td>
<td>(2) Cumulative</td>
</tr>
<tr>
<td><strong>A. Reenrollment</strong></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Pell Grant aid ($1k)</td>
<td>0.012</td>
<td>-0.002</td>
</tr>
<tr>
<td></td>
<td>(0.020)</td>
<td>(0.023)</td>
</tr>
<tr>
<td></td>
<td>[-0.03, 0.05]</td>
<td>[-0.05, 0.04]</td>
</tr>
<tr>
<td>Mean</td>
<td>Pell Grant ineligible</td>
<td>0.79</td>
</tr>
<tr>
<td>Observations</td>
<td>38,100</td>
<td>32,271</td>
</tr>
</tbody>
</table>
## The Impact of Pell Grant Aid on Attainment

<table>
<thead>
<tr>
<th>B. Credits attempted (academic + remedial)</th>
<th>First-year students</th>
<th>Returning students</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>(1) Current</td>
<td>(2) Cumulative</td>
</tr>
<tr>
<td>Pell Grant aid ($1k)</td>
<td>0.490</td>
<td>0.539</td>
</tr>
<tr>
<td></td>
<td>(0.266)+</td>
<td>(1.190)</td>
</tr>
<tr>
<td></td>
<td>[-0.03, 1.01]</td>
<td>[-1.79, 2.87]</td>
</tr>
<tr>
<td>Mean</td>
<td>Pell Grant ineligible</td>
<td>25.5</td>
</tr>
<tr>
<td>Observations</td>
<td>38,100</td>
<td>32,271</td>
</tr>
</tbody>
</table>
## The Impact of Pell Grant Aid on Attainment

<table>
<thead>
<tr>
<th></th>
<th>First-year students</th>
<th>Returning students</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>(1) Current</td>
<td>(2) Cumulative</td>
</tr>
<tr>
<td><strong>C. Credits earned (academic only)</strong></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Pell Grant aid ($1k)</td>
<td>0.212</td>
<td>0.223</td>
</tr>
<tr>
<td></td>
<td>(0.410)</td>
<td>(1.233)</td>
</tr>
<tr>
<td></td>
<td>[-0.59, 1.02]</td>
<td>[-2.19, 2.64]</td>
</tr>
<tr>
<td>Mean</td>
<td>Pell Grant ineligible</td>
<td>17.6</td>
</tr>
<tr>
<td>Observations</td>
<td>38,100</td>
<td>32,271</td>
</tr>
</tbody>
</table>
# The Impact of Pell Grant Aid on Attainment

<table>
<thead>
<tr>
<th></th>
<th>First-year students</th>
<th>Returning students</th>
<th></th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>(1) Current</td>
<td>(2) Cumulative</td>
<td>(3) Current</td>
</tr>
<tr>
<td><strong>D. Cumulative grade point average</strong></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Pell Grant aid ($1k)</td>
<td>-0.025</td>
<td>--</td>
<td>0.003</td>
</tr>
<tr>
<td></td>
<td>(0.035)</td>
<td>--</td>
<td>(0.032)</td>
</tr>
<tr>
<td></td>
<td>[-0.09, 0.04]</td>
<td>--</td>
<td>[-0.06, 0.07]</td>
</tr>
<tr>
<td>Mean</td>
<td>Pell Grant ineligible</td>
<td>2.65</td>
<td>--</td>
</tr>
<tr>
<td>Observations</td>
<td>34,203</td>
<td>--</td>
<td>44,231</td>
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</table>
# Heterogeneity in the Impact of Pell Grant Aid on Borrowing

<table>
<thead>
<tr>
<th>Student has characteristic:</th>
<th>(1) Immigrant</th>
<th>(2) Dependent student</th>
<th>(3) College educated parent</th>
<th>(4) Attending community college</th>
</tr>
</thead>
<tbody>
<tr>
<td>Pell Grant aid</td>
<td>-0.613</td>
<td>-0.424</td>
<td>-0.457</td>
<td>-0.355</td>
</tr>
<tr>
<td></td>
<td>(0.141)**</td>
<td>(0.436)</td>
<td>(0.118)**</td>
<td>(0.118)**</td>
</tr>
<tr>
<td></td>
<td>-0.255</td>
<td>-0.433</td>
<td>-0.458</td>
<td>-0.555</td>
</tr>
<tr>
<td></td>
<td>(0.115)*</td>
<td>(0.087)**</td>
<td>(0.150)**</td>
<td>(0.147)**</td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Test of eq: p-value</td>
<td>0.053</td>
<td>0.984</td>
<td>0.998</td>
<td>0.29</td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Crowd-out</td>
<td>borrower</td>
<td>-2.229</td>
<td>-1.689</td>
<td>-1.961</td>
</tr>
<tr>
<td></td>
<td>(0.344)**</td>
<td>(1.492)**</td>
<td>(0.369)**</td>
<td>(0.375)**</td>
</tr>
<tr>
<td></td>
<td>-1.294</td>
<td>-1.858</td>
<td>-1.877</td>
<td>-2.313</td>
</tr>
<tr>
<td></td>
<td>(0.465)**</td>
<td>(0.250)**</td>
<td>(0.424)**</td>
<td>(0.464)**</td>
</tr>
<tr>
<td>H0: crowd-out &gt; -1, p-value</td>
<td>&lt;0.001</td>
<td>0.322</td>
<td>&lt;0.001</td>
<td>0.087</td>
</tr>
<tr>
<td></td>
<td>0.263</td>
<td>0.005</td>
<td>0.019</td>
<td>0.002</td>
</tr>
<tr>
<td>Test of eq: p-value</td>
<td>0.614</td>
<td>0.972</td>
<td>0.966</td>
<td>0.681</td>
</tr>
<tr>
<td>Observations</td>
<td>38,100</td>
<td>38,100</td>
<td>35,011</td>
<td>38,100</td>
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</tbody>
</table>
## Heterogeneity in the Impact of Pell Grant Aid on Attainment

### B. Dependent variable = credits earned

<table>
<thead>
<tr>
<th>Student has characteristic:</th>
<th>(1) Immigrant</th>
<th>(2) Dependent student</th>
<th>(3) College educated parent</th>
<th>(4) Attending community college</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>N</td>
<td>Y</td>
<td>N</td>
<td>Y</td>
</tr>
<tr>
<td>Pell Grant aid ($1k)</td>
<td>0.061</td>
<td>0.440</td>
<td>3.371</td>
<td>-0.003</td>
</tr>
<tr>
<td></td>
<td>(0.543)</td>
<td>(0.551)</td>
<td>(1.292)**</td>
<td>(0.431)</td>
</tr>
<tr>
<td>Test of eq: p-value</td>
<td>0.600</td>
<td>0.016</td>
<td>0.434</td>
<td></td>
</tr>
<tr>
<td>Observations</td>
<td>38,100</td>
<td>38,100</td>
<td>35,011</td>
<td></td>
</tr>
</tbody>
</table>
Log Likelihood

\[
\log L (\theta | d_i, X_{it}) = \\
\sum_{d_{it}=0} \log \left( \int_0^{\infty} G (d_i - X_{it} \beta, \theta_e) f (d_i, \theta_d) \, dd_i \right) + \\
\sum_{0<d_{it}<d_{it}^{max}} \log \left( (1 - \rho) g (d_{it} - X_{it} \beta, \theta_e) F (d_{it}, \theta_d) \right) \\
+ \sum_{d_{it}=d_{it}^{max}} \log \left[ \rho \int_0^{d_{it}^{max}} (1 - G (d_i - X_{it} \beta, \theta_e)) f (d_i, \theta_d) \, dd_i + \int_{d_{it}^{max}}^{\infty} \left( 1 - G \left( d_{it}^{max} - X_{it} \beta, \theta_e \right) \right) f (d_i, \theta_d) \, dd_i \right]
\]
The City University of New York - Baruch College

July 8, 2016

Costs in the 2013-14 year

Estimated Cost of Attendance
- Tuition and fees: $X,XXX / yr
- Housing and meals: X,XXX
- Books and supplies: X,XXX
- Transportation: X,XXX
- Other education costs: X,XXX

Grants and scholarships to pay for college

Total Grants and Scholarships (Gift Aid; no repayment needed)
- Grants from your school: $X,XXX
- Federal Pell Grant: X,XXX
- Grants from your state: X,XXX
- Other scholarships you can use: X,XXX

What will you pay for college

Net Costs
(Cost of attendance minus total grants and scholarships)
$X,XXX / yr

Options to pay net costs

Work options
- Work-Study (Federal, state, or institutional): $X,XXX

Loan Options*
- Federal Perkins Loan: X,XXX
- Federal Direct Subsidized Loan: X,XXX
- Federal Direct Unsubsidized Loan: X,XXX

*Revised amounts shown here. You may be eligible for a different amount. Contact your financial aid office.

Other options

Family Contribution
(As calculated by the institution using information reported on the FAFSA or to your institution.)
$X,XXX / yr

- Payment plan offered by the institution
- Military and/or National Service benefits
- Parent PLUS Loan
- Non-Federal private education loan

Institutional 1st Year Retention
Percentage of Full Time Freshman
Low: 85%
Medium: 85%
High: 85%

Degrees Awarded 2011-2012: 2,716

Loan Default Rate
Percentage of borrowers entering repayment defaulting on their loan
This institution: 3.3%
National: 4.3%

Median Borrowing
Students at Baruch College typically borrow $9,300 in Federal loans for their undergraduate study. The Federal loan payment over 10 years for this amount is approximately $107.13 per month. Your borrowing may be different.

Repaying your loan
To learn about loan repayment choices and work out your Federal Loan monthly payment, go to:
http://studentaid.ed.gov/repay-loans/understand/plans

For more information and next steps:
Baruch College
Financial Aid Office
151 E 25th Street, Room 880
New York, NY 10010
Telephone: (646) 312-1360
E-mail: financialaid@baruch.cuny.edu

The above awards are estimated and based upon the data provided on the FAFSA. For federal loan eligibility, consult with the Office of Financial Aid to understand the rights and responsibilities of borrowing. Be sure to respond timely to financial aid requests for missing information. For more details, visit http://www.cuny.edu/admissions/financial-aid.html
York College Student Loan Guidelines

Federal Direct Subsidized/Unsubsidized/Plus Loan

HOW TO GET STARTED:

By accepting and signing the attached application you are requesting a Federal Direct Loan to be processed on your behalf. Before submitting your Federal Direct Loan Request Form you must meet all of the following criteria:

✓ You must have completed a FAFSA (all requested documentations must be processed and approved)
✓ You must be in good satisfactory academic standing
✓ You must be registered for at least 6 credits (per semester)
✓ You must be a matriculated student (registered in a degree program)
✓ You must complete, print and attach an Entrance Counseling Congratulations Page

(If this is your first loan at York College, please attend FADES Workshop)

PRIORITY DATES FOR FALL AND SPRING: OCTOBER 15 & MARCH 15

ANNUAL UNDERGRADUATE LOAN LIMITS:

The following chart includes one semester and annual loan limits (base amounts for both subsidized and unsubsidized loans) per academic year:

<table>
<thead>
<tr>
<th>Year</th>
<th>Base Amount SUB/UNSUB</th>
<th>Additional UNSUB</th>
<th>Independent Student/Parent PLUS</th>
</tr>
</thead>
<tbody>
<tr>
<td>1st Year (0-27 credits)</td>
<td>$3,500 $1,750 one semester</td>
<td>$2,000 $1,000 one semester</td>
<td>$4,000 $2,000 one semester</td>
</tr>
<tr>
<td>2nd Year (28-60 credits)</td>
<td>$4,500 $2,250 one semester</td>
<td>$2,000 $1,000 one semester</td>
<td>$4,000 $2,000 one semester</td>
</tr>
<tr>
<td>3rd &amp; above (61 &amp; more)</td>
<td>$5,500 $2,750 one semester</td>
<td>$2,000 $1,000 one semester</td>
<td>$5,000 $2,500 one semester</td>
</tr>
</tbody>
</table>

⚠️ This is a LOAN (not a grant) and MUST be repaid with interest. Borrow only what you need.

SUBSIDIZED FEDERAL DIRECT LOAN:

The Subsidized Federal Direct loan is based on financial need and amounts are calculated by a Federal formula and grade level. When a loan is subsidized, the government pays the interest for you during the following periods:

✈️ While you are enrolled in school at least 6 credits (per semester)
✈️ During the six-month grace period after you graduate or stop attending school at least half-time
✈️ During periods of authorized deferments

UNSUBSIDIZED FEDERAL DIRECT LOAN:

The Unsubsidized Federal Direct Loan is not determined by the need formula. When the loan is unsubsidized, the student is responsible for the interest that accrues during school, grace and deferment periods. This loan provides additional funds for independent students and for dependent students whose parents are ineligible to borrow under the PLUS Loan program. Dependent students are eligible to borrow additional unsubsidized loans (base amount can not be exceeded).
IMPORTANT POINTS ABOUT YOUR FEDERAL DIRECT LOAN:

➢ In approximately 2 weeks, you will be notified by mail of the status of your Federal Direct Loan request. If your loan request has been approved and you are still interested in borrowing a loan, you must complete, sign and submit an electronic Master Promissory Note to the Department of Education.

➢ Your final loan amount will be based on your Cost of Attendance (COA), less any financial aid and scholarships received and your Expected Family Contribution (EFC), which is calculated by your FAFSA.

➢ All loans are disbursed in two equal payments; one disbursement for each semester. Once your attendance has been verified, your Direct Loan will disburse in accordance with the Payroll Calendar. If you request a semester only loan, your loan will also disburse in two equal payments for the semester. For your convenience, Direct deposit forms are available on-line.

➢ You may reduce or cancel your loan at any time prior to disbursement. Increase, Reduction and Cancellation Request Forms are available for printing on-line.

➢ All first time borrowers must sign a Master Promissory Note. (If you have previously signed a Master Promissory Note within the last 10 years for a Direct Loan your Master Promissory Note is still valid. You do not need to sign another note). To obtain information regarding the on-line Entrance Interview Loan Counseling Session and Master Promissory Note application process, visit www.york.cuny.edu/finaid and click on “Quick Links.”

IMPORTANT WEBSITES:

If you have any questions after reading the material provided, please contact us in the Financial Aid Office at 718.262.2230. You may also obtain further information about the Federal Direct Loan program or check on the status of your loan(s) at the following web addresses:

<table>
<thead>
<tr>
<th>York College &amp; SIMS</th>
<th><a href="http://www.york.cuny.edu/finaid">www.york.cuny.edu/finaid</a></th>
</tr>
</thead>
<tbody>
<tr>
<td>CUNY PORTAL</td>
<td><a href="http://www.cuny.edu">www.cuny.edu</a></td>
</tr>
<tr>
<td>Direct Loan Servicing Center ACS:</td>
<td><a href="http://www.studentloans.gov">www.studentloans.gov</a></td>
</tr>
<tr>
<td>U.S. Department of Education’s National Student Loan Data System:</td>
<td><a href="http://www.nslds.ed.gov">www.nslds.ed.gov</a></td>
</tr>
<tr>
<td>Great lakes Educational Loan Services, Inc.</td>
<td><a href="http://www.mygreatlakes.org">www.mygreatlakes.org</a></td>
</tr>
<tr>
<td>Nelnet</td>
<td><a href="http://www.nelnet.com">www.nelnet.com</a></td>
</tr>
<tr>
<td>Sallie Mae</td>
<td><a href="http://www.salliemae.com">www.salliemae.com</a></td>
</tr>
<tr>
<td>Federal Student Aid P.I.N:</td>
<td><a href="http://www.pin.ed.gov">www.pin.ed.gov</a></td>
</tr>
<tr>
<td>Free Application For Federal Student Aid (FAFSA):</td>
<td><a href="http://www.fafsa.ed.gov">www.fafsa.ed.gov</a></td>
</tr>
<tr>
<td>IBR and Public Service Loan Forgiveness:</td>
<td><a href="http://www.ibrinfo.org">www.ibrinfo.org</a></td>
</tr>
</tbody>
</table>
# Federal Direct Loan Request Form

**Attach Copy of “Congratulations “Page from Entrance Counseling**

**BORROWER SECTION**

<table>
<thead>
<tr>
<th></th>
<th>PLEASE PRINT OR TYPE</th>
</tr>
</thead>
<tbody>
<tr>
<td>1. Last Name</td>
<td>First Name</td>
</tr>
<tr>
<td>2. Social Security Number</td>
<td>–</td>
</tr>
<tr>
<td>3. Permanent Street Address <strong>including Apartment #</strong></td>
<td>City</td>
</tr>
<tr>
<td>4. Telephone Number</td>
<td></td>
</tr>
<tr>
<td>Day (  )</td>
<td>Evening (  )</td>
</tr>
<tr>
<td>5. Date of Birth (MM/DD/YY)</td>
<td>/</td>
</tr>
<tr>
<td>6. York College E-mail Address</td>
<td></td>
</tr>
</tbody>
</table>

7. Expected Graduation Date: _______/______ (mm/yy)

8. Is this your FIRST Federal Direct Loan at YORK College? No [ ] Yes [ ] (If Yes, You must attend FADES)

9. Loan Period: [ ] Summer [ ] Fall [ ] Spring (Check all semesters that apply)

10. Enrolled for how many credits per semester? Summer: _______ Fall: _______ Spring: _______

11. Loan type: [ ] Subsidized [ ] Unsubsidized *(Unsubsidized loans accrue interest as of the day it is disbursed to York College until repaid in full)*

**Total loan amount requested:** $_____________________

---

**BORROWER’S CERTIFICATION:** PLEASE READ THE INFORMATION BELOW BEFORE SIGNING THIS REQUEST FORM

By signing this form, I certify that the above information is accurate and true. I understand that this is a request form for a loan (not the Master Promissory Note) and that the loan must be repaid. I also understand that I must maintain half-time status (6 credits) in order for my loan to remain active. If I drop below 6 credits or leave school, I am required to complete an Exit Interview on-line. If I receive additional aid, the Financial Aid Office will reduce or terminate my loan and I am responsible to pay any outstanding balance to Bursar immediately. In order for my loan funds to disburse, I must have a valid FAFSA, be enrolled for 6 credits, maintain good Satisfactory Academic Progress, have completed an Entrance Exam and have signed a Master Promissory Note.

Student Signature: ___________________________________________ Date: _______________________

**FOR OFFICE USE ONLY**

Your request has been approved for the following amount(s): _________________ Subsidized; _________________ Unsubsidized

Staff Signature: ___________________________________________ Processed Date: _______________________

94-20 Guy R. Brewer Blvd., Room AC 1M08 Jamaica, NY 11451 www.york.cuny.edu/finaid