Borrowing Among Academically Underprepared Students: Facilitating Success or Perpetuating Inequity at the Community College?

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Introduction

Should students who are academically underprepared for college have immediate, unrestricted access to student loans? Approximately 60% of community college students nationally are placed into developmental coursework and completion rates for these students are highly disappointing: only one in 10 earns a community college credential within three years, while one in three has earned a bachelor's degree within six years (Complete College America, 2012). Although most developmental education (Dev Ed) students drop out before earning a degree, a recent national study found that in 2011-12, Dev Ed community college students (36%) borrowed at similar rates as their college-ready peers (38%) (Fernandez, Barone, & Klepfer, 2014). Dev Ed students are a vulnerable population of borrowers, as non-completion has consistently been identified as the strongest predictor of loan default (Gross et al., 2009).

Currently, most community college students assigned to Dev Ed, regardless of their depth and breadth of academic deficiency, can take out a federal student loan their first semester and borrow the same amount as their college-ready peers[1]. There are benefits to this policy approach. Lower-income, racial/ethnic minority, and first-generation college students are overrepresented in Dev Ed (Bahr, 2010a; Perin, 2013) and many may be unable, or unwilling, to pursue higher education without access to loans. If federal loans were restricted or denied to Dev Ed students, many would likely turn to private loans, which have higher interest rates and less forgiving repayment terms (Project on Student Debt, 2011). Additionally, 40% of Dev Ed community college students who earned a degree in 2011-12 had utilized loans in route to earning their credential (Fernandez et al., 2014). In sum, federal loans may be an important policy lever for

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[1] Assuming the college participates in the federal student loan programs (see Project on Student Debt, 2011) and the student meets the basic eligibility criteria: https://studentaid.ed.gov/sa/eligibility/basic-criteria.

increasing college access and completion among academically underprepared students, the majority of whom are from less advantaged groups.

On the other hand, allowing Dev Ed students unrestricted access to loans in their first semester immediately places debt burden on students whose skills in one or more foundational subject areas (i.e., math, reading, writing) are not at college-level. Discouragingly, about three out of every four Dev Ed students drop out before even having completed their first college-level English and math course (Complete College America, 2012). Dropping out with debt typically places a borrower in a worse financial situation than if they had never attended college in the first place (Gladieux & Perna, 2005; Nguyen, 2012). Moreover, recent studies have found the largest proportion of community college loan defaulters had $5,000 or less in student loan debt (Campbell & Hillman, 2015; McKinney, Gross, & Inge, 2014), indicating that even relatively small debt amounts can place severe hardship on borrowers in this sector. Loans often have disproportionally negative effects on borrowers who are lower-income and racial/ethnic minorities (Chen, 2008; Kim, 2007), groups overrepresented in Dev Ed. For these reasons, current loan policy may be perpetuating inequities experienced by lower-income students and students of color.

Recognizing the potential consequences of allowing academically underprepared students to assume financial debt, the National Association of Student Financial Aid Administrators (2013) proposed a student loan eligibility index based on the premise it is unwise, and socially unjust, to place these students immediately into debt. Under this type of index, students at the greatest risk for non-success would not be allowed to borrow *initially* or would be limited to a lower loan limit. After demonstrating the ability to successfully complete early coursework, students would then become eligible for loans, or the maximum loan amount. Consideration of

such a significant policy change, which would impact millions of students nationwide, should be informed by empirical evidence. Unfortunately, research that specifically examines the impact of loans on academically underprepared college students is scarce.

The purpose of this study was to understand the relationship between federal loan borrowing and persistence for a sample of racially/ethnically diverse students at a large, urban Texas community college who were referred to developmental coursework. To the best of our knowledge, this study is the first to explicitly control for self-selection bias to examine the impact of borrowing on the enrollment outcomes of Dev Ed students. Three research questions guided this study:

1. What are the characteristics of developmental education students at an urban community college who take out federal loans?
   a. Are their characteristics different than borrowers who are college-ready?

2. What are the characteristics of development education borrowers who drop out of college?

3. After controlling for selection bias, are there significant differences in persistence among developmental education students who do, and do not, use federal loans?
   a. Does borrowing have a differential impact on persistence for developmental education students, compared to college-ready students?

Literature Review

Empirical research on student loans has predominately focused on borrowers attending, or graduating from, four-year institutions. But as loan uptake among community college students has increased (Baum, Little, & Payea, 2011), more studies have investigated the impact of loans on community college students. Research shows these students often lack the information and guidance needed to make informed decisions about borrowing (McKinney et al., 2015; TICAS, 2012). Exacerbating this problem is that community college financial aid offices are sorely understaffed (McKinney & Roberts, 2012) and counselors do not have time to meet with every

student who needs loan counseling (McKinney, Roberts, & Shefman, 2013; TICAS, 2012). Recognizing that poor decisions about borrowing increase the likelihood of loan default in the future, several recent studies have recommended strategies that could better inform, and protect, borrowers at community colleges (Campbell & Hillman, 2015; McKibben, LaRocque, M., & Cochrane, 2014; McKinney, Gross, & Backscheider-Burridge, 2015; TICAS, 2012).

A few multivariate quantitative studies have examined the relationship between loans and community college student persistence. McKinney and Backscheider-Burridge (2015) provide a systematic review of these studies, so they are not reviewed in detail here. But overall, findings from these studies are mixed and inconclusive. Researchers have found loans to have a positive effect (Mendoza, Mendez, & Malcolm, 2010), negative effect (Cofer & Somers, 2001; Dowd & Coury, 2006), and no significant effect (Hippensteel, St. John, & Starkey, 1996; St. John & Starkey, 1994) on persistence for community college students. As Dowd (2008) explained, these mixed results could be attributed to differences in the samples selected, statistical techniques employed, time period under investigation, and outcome measures of interest.

The lack of reliable findings from prior studies that have estimated the causal effects of financial aid on student outcomes (in both the two-year and four-year sectors) has led to criticism of this body of literature (Alon, 2005; Cellini, 2008; Chen, 2008; Dowd, 2008). More recent work in this area has incorporated new theoretical lenses and statistical techniques to better estimate the effects of financial aid on student outcomes. A study using BPS:04/09 data found that after matching students using propensity scores, associate degree-seeking community college students who borrowed were more likely to eventually drop out than non-borrowers (McKinney & Backscheider-Burridge, 2015). Challenging conventional wisdom that community colleges provide a less-expensive pathway to the baccalaureate, González Canche (2014) used

quasi-experimental techniques and found that similar community college and public four-year students who earned a bachelor's degree had similar levels of debt and repayment.

Fernandez et al. (2014) conducted one of the only studies paying specific attention to borrowing among Dev Ed students. Using data from BPS:04/09 and NPSAS:12, the authors found that 36% of Dev Ed community college students had taken out a loan in 2011-12, compared to 38% of their college-ready peers. The median debt level for Dev Ed borrowers ($7,500) was slightly less than for the college-ready borrowers ($8,270). Six years after entering the community college, 29% of Dev Ed borrowers had not yet entered repayment, compared to 18% of college-ready borrowers. While this report provides new insights about borrowing among Dev Ed students, the findings are purely descriptive in nature and do not account for self-selection bias that can accompany the decision to borrow.

Borrowing is risky for Dev Ed students because of the strong relationship between non-completion and loan default. Only a handful of studies have examined predictors of loan default for community college students. Examining one particular community college, Christman (2000) used descriptive statistics to determine that defaulters were more likely to be lower-income, Native American or African American, and had poorer academic performance. A more recent study (McKinney, Gross, & Inge, 2014) using BPS:04/09 data and multivariate methods found community college defaulters were more likely to be male, age 24 or above, first-generation college, lower-income, enrolled in non-associate's degree programs, and non-completers. Most defaulters at Iowa's community colleges had borrowed small amounts and dropped out having earned less than 15 credits (Campbell & Hillman, 2015). Steiner and Barone (2014) found that borrowers at Austin Community College in Texas who had taken Dev Ed math courses had a greater likelihood of eventually defaulting.

In sum, there is a dearth of research on the impact of loans on community college students in general, and on Dev Ed students in particular. While the availability of loans may enable students to enroll in community college, evidence that loans facilitate degree completion for students in this sector is weak. Research suggests the types of students overrepresented in Dev Ed (i.e., lower-income, racial/ethnic minority, first-generation college, non-completers) are at the greatest risk of loan default. The goal of our study is to extend research in this area, and offer findings that will inform public policies and institutional practices regarding loan utilization among academically underprepared students.

Conceptual Framework

We used Chen's (2008) heterogeneous research approach for studying the impact of financial aid on student persistence as our conceptual framework. An important contribution of this framework is that it focuses explicitly on the complex relationship between financial aid and student dropout from higher education. Prominent classic theories of student persistence (Bean & Metzner, 1985; Spady, 1970; Tinto, 1975) give general attention to the role of financial aid but have tended to assume that aid exerts a homogenous effect on all students. In reality, a growing body of literature corroborates that different types of financial aid, as well as the amount of aid received, can influence persistence differently as a function of student demographics (Chen & DesJardins, 2010; Dowd, 2008; Hillman, 2015; Jackson & Reynolds, 2013; Kim, 2007).

A central tenant of Chen's framework is that students' income status and race/ethnicity should be considered when evaluating the impact of financial aid on persistence. Researchers should take into account that college students are a heterogeneous population and may not respond uniformly to different types, and amounts, of financial aid. For example, research has found that Hispanic and Asian students are more "debt averse" than other racial/ethnic groups

and therefore less likely to borrow (Cunningham & Santiago, 2008). Chen's framework

incorporates perspectives from five major theoretical approaches used in studying persistence

(i.e., psychological, sociological, organizational, interactionalist, economic). Following a critical

review of prior research on student persistence, Chen proposes consideration of eight clusters of

independent variables: student background, educational aspiration, pre-college preparation,

financial factors, college experience, institutional characteristics, interaction effects, and time in

college. We used these clusters to guide the selection of variables in our study.

Chen's recommendations for data analysis informed our research design and statistical

modeling. Given the temporal nature of student dropout, longitudinal, rather than cross-sectional,

datasets are recommended. Many studies examining the impact of loans on student persistence

are plagued by self-selection bias (Chen, 2008; Dowd, 2008), as the outcomes for students who

choose to borrow may be systemically different than those who do not borrow. We used

propensity score matching to assuage self-selection bias in our study. As recommended by Chen,

we examined differences in borrowing as a function of students' race/ethnicity and income

status. Mindful that loans may exert a differential effect as a function of a student's level of

academic preparedness, we also compared the persistence of Dev Ed borrowers with college-

ready borrowers.

Methodology

Data Source and Sample

This study analyzed longitudinal student unit record data from the Urban Community

College (UCC) district (a pseudonym) in Texas. UCC operates multiple campuses within a large

metropolitan area of the state, and serves more than 60,000 credit students each year. The largest

proportion of UCC students are non-White, lower-income, and academically underprepared for college-level coursework in one or more subject areas.

Our dataset was built using information from UCC student transcripts. Transcripts contain detailed information about student enrollment patterns, course grades, credits completed, and credentials earned. By organizing these institutional records longitudinally and incorporating demographic data, transcripts serve as a valuable, yet underutilized, resource for examining student success (Hagedorn, 2005; Hagedorn & Kress, 2008; Leinbach & Jenkins, 2008). The level of detail provided by transcripts was necessary in order to determine achievement of several intermediate measures of persistence (i.e., completing 15 and 30 credit hours) used in our study. The transcript data were merged with UCC financial aid records, and with transfer data from the National Student Clearinghouse.

The dataset tracked a cohort of students who enrolled at any of the UCC campuses during the Fall 2007 semester and followed them through the Summer 2013 semester, yielding data from six academic years. The sample for this study included students that were first time in college (FTIC) upon entry into UCC in Fall 2007 and had filed a FAFSA during their first year of enrollment (n= 3,165). Our sample was restricted to FAFSA filers because submitting this application is required to receive a federal student loan. Given our research questions and goals of this study, our analysis focused on two student sub-groups:

1.) *Developmental Education Students* (n=2,439). The majority of students in the full sample (77%) were referred to developmental coursework in one or more subject area (i.e., math, reading, writing). Referral to Dev Ed courses at UCC primarily occurs through the student's score on placement tests, but can also occur from a counselor's recommendation. Research indicates that as many as 30% of community college students who are referred to Dev Ed

coursework never enroll in these courses (Bailey, Jeong, Cho, 2010). We used referral to Dev Ed to select this sub-group because our goal was to understand how loans impacted persistence among academically underprepared students; not just for students who were referred and subsequently enrolled in Dev Ed courses.

As Figure 1 demonstrates, nearly half of all students in the Dev Ed group had remediation needs in multiple subject areas, and 33% required remediation in all three subjects. For example, among the 98% of Dev Ed students who required math remediation, 49% also required remediation in reading and/or writing. For the 39% and 45% of Dev Ed students referred to remedial reading and writing, respectively, nearly all of these students also required remediation in math. With regards to borrowing, 17% of students in Dev Ed group had taken out a federal student loan during their first year of enrollment.
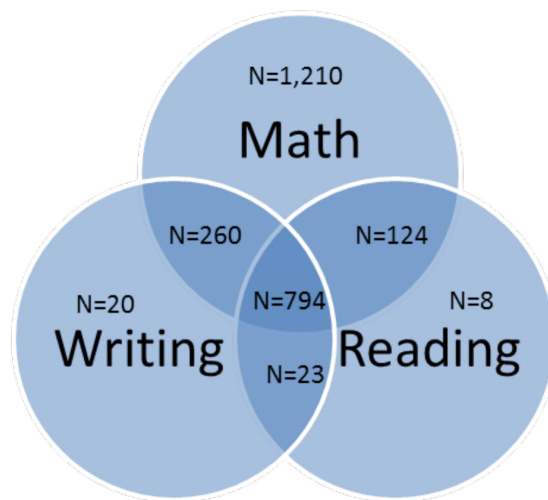

Figure 1: Venn Diagram of Subject Overlap among Developmental Education Students

2.) *College-Ready Students* (n=726). College-ready students comprised 23% of the full sample. Students were classified as college-ready if they were not referred to developmental coursework in any subject area. Approximately 18% of the college-ready group took out a federal student loan in their first year of enrollment.

Propensity Score Matching

A primary goal of this study was to estimate a treatment effect of borrowing on student persistence. Because taking out a federal loan is dependent on students' self-selection, propensity score matching is an appropriate methodology (Murnane & Willet, 2011). Propensity score matching uses a logistic regression model to obtain a probability (propensity score) that the student will select into the treatment. The treatment (borrowing) and control (not borrowing) groups are created by matching students with similar propensities, which approximates random assignment. Propensity score matching allows for a comparison of statistically similar groups of students, with the goal of understanding what the outcome would have been for a borrower if they had not borrowed (Reynolds & DesJardins, 2009). In order to obtain a propensity score for the likelihood of borrowing, relevant demographic and academic variables were used in a logistic regression model that predicts borrowing. The propensity score predictor variables used in this study were associated with either the treatment condition (borrowing) or the outcome variables (Guo & Fraser, 2010; Reynolds & DesJardins, 2009).

Variables

The independent variables were organized into two primary categories: demographic characteristics (gender; race/ethnicity; age; expected family contribution (EFC); first-generation status); and academic experiences (pre-college preparation; enrollment intensity; program of study). All of these variables were measured in Fall 2007, the semester of the students' initial enrollment at UCC. Age and EFC were continuous, and all of the other variables were categorical. Race/ethnicity and pre-college preparation are the only categorical variables with more than two levels. Race/ethnicity has five levels: White, Hispanic, African American, Asian, and other (Native Americans, unknown ethnicity, FAFSA eligible non-resident aliens), with all

non-White ethnicities compared to the White group (reference level). First-generation status indicated whether either of the student's parents had attended college.

Pre-college preparation has two levels: earned a high school diploma (reference level) or GED. We used enrollment status in Fall 2007 as a measure of early enrollment intensity, but recognize that some community college students exhibit complex enrollment patterns across semesters (Crosta, 2013). Full-time enrollment at UCC is defined as enrolling in 12 or more credit hours in a given semester. The program of study variable indicated whether the student was enrolled in a program classified as academic, or vocational/technical. For the Dev Ed group, a binary variable for each remediation subject (i.e., math, reading, writing) was included in the propensity score model. Treating each remediation subject as its own binary variable allowed the model to account for the overlap in remediation subject areas displayed in Figure 1.

Our goal was to understand the impact of borrowing on both intermediate and final enrollment measures for academically underprepared community college students. Four dichotomous variables were used (all coded 0=no, 1=yes): credit hour completion (whether the student ever completed 15 and 30 semester credit hours), credential attainment from UCC (a certificate or associate degree), and four-year transfer. These variables are metrics used in Texas' performance-based funding model for community colleges. All four measures were compared for borrowers and non-borrowers across the two sub-groups (Dev Ed and college-ready) to determine if there were significant differences by borrowing status and academic preparedness. The outcome variables were measured as of Summer 2013, the last semester in the dataset and a full six years after the students' initial enrollment at UCC.

Data Analysis

All descriptive and inferential analyses were completed using Stata 10 (Stata Corp, 2010). The first two research questions were addressed with descriptive analytical methods. A chi-squared test was used to determine, for both the Dev Ed and college-ready groups, if the proportion of students with each demographic or academic experience attribute were different between borrowers and non-borrowers. A t-test was used for the continuous variables to determine if average age and EFC were different for borrowers, compared to non-borrowers, among the two sub-groups. The same procedures were applied to compare the characteristics of successful and unsuccessful Dev Ed borrowers.

The third research question used propensity score matching. The question was addressed by matching Dev Ed students and comparing the enrollment outcomes of borrowers to similar non-borrowers. To determine if borrowing had a differential effect on Dev Ed students compared to college-ready students (research question three), the same matching process was used for the college-ready group. Matching by propensity score within each group allows the treatment effect to vary by sub-group (Reynolds & DesJardins, 2009). The potential differential effect of borrowing for Dev Ed students was assessed by comparing the impact of loans on persistence across the two sub-groups.

Table 1 presents the logistic regression coefficients for the models that predicted the associations of demographic and academic experience variables with borrowing for both sub-groups. Gender had a differential effect among the sub-groups, as it was only significant among the Dev Ed students. Being a male was negatively associated with borrowing for the Dev Ed students, but not for the college-ready group. Across both sub-groups, race/ethnicity, age, and enrollment intensity were significant predictors of borrowing. Asian and Hispanic students were

less likely to borrow compared to White students. African American students were more likely to borrow compared to White students, but only among the college-ready group. Among both groups, older students were more likely to borrow, as were full-time students. Among the Dev Ed group, students with remediation requirements in math were more likely to borrow.

Table 1: Logistic Regression Coefficients, Propensity to Borrow

	Dev Ed	College-Ready
Male (female)	-0.38 (0.13)*	-0.17 (0.21)
Ethnicity (White)		
Asian	-1.05 (0.31)*	-1.03 (0.43)*
African American	0.25 (0.18)	0.57 (0.29)*
Hispanic	-1.33 (0.22)*	-1.15 (0.37)*
Other	-0.36 (0.29)	-0.06 (0.42)
Age	0.05 (0.01)*	0.03 (0.01)*
First Generation College (no)	0.18 (0.12)	0.09 (0.23)
Expected Family Contribution	0.01 (0.01)	-0.02 (0.02)
Pre-College Prep (HS diploma)		
GED	0.16 (0.19)	0.47 (0.32)
Other (e.g. home-schooled)	0.29 (0.32)	-0.39 (0.65)
Program of Study (academic)	0.09 (0.12)	-0.10 (0.22)
Enrollment Intensity (full-time)	0.29 (0.12)*	0.52 (0.21)*
Developmental Placement		
Math	1.63 (0.74)*	
English	-0.17 (0.15)	
Reading	-0.16 (0.16)	
N	2,439	726
Likelihood Ratio Chi-Squared	238.89	70.14
Degrees Freedom	15	12
Psuedo R^2	0.1069	0.1028

Cells display the regression coefficient with its standard error in parentheses and an asterisk to indicate when $p<.05$

The coefficients from Table 1 were used to calculate the probability a student would take out a federal loan. This probability (propensity score) was used to balance the data by matching borrowers to similar non-borrowers. Therefore, relevant demographic and academic experience variables were accounted for in the inferential analysis that estimated the effect of borrowing on

student persistence. This study used one-to-one (caliper) matching without replacement, with the criterion that a borrower must have a propensity score similar (within a quarter of a standard deviation of the sub-group's propensity score) to a non-borrower (Reynolds & DesJardins, 2009). As a result, six college-ready borrowers were excluded from the analysis because their propensity to borrow was so different than all of the non-borrowers, there was no comparable student with whom to match. The remaining 522 borrowers (both sub-groups) were matched with one non-borrower based on having the most similar propensity score.

The difference in the four persistence measures between borrowers and non-borrowers among the matched data is considered the average treatment effect (ATE) among the treated. This is interpreted as the difference in enrollment outcomes that can be attributed to the effect of borrowing (Guo & Fraser, 2010). If there is no ATE, one can assume borrowing did little to assist students in achieving that particular persistence measure. We assessed the ATE for each of the four outcome variables among the Dev Ed and college-ready groups.

Limitations

The selection of propensity score predictors should be related, based on theory and prior research, to choosing the treatment or outcome of interest. A critique of propensity score matching, however, is that the method does not serve as an effective means to reduce self-selection bias when the propensity score model is missing important variables (Padgett, Salisbury, An, & Pascarella, 2010). Our propensity score model includes relevant covariates from the UCC dataset, but the dataset does not include measures of some constructs (e.g., hours worked off campus, familial responsibilities) that may influence community college student persistence. We also acknowledge that some students may take longer than six years to earn a credential from the community college. The final enrollment outcomes of these students are not

captured in our dataset. Relatedly, while our results examine the impact of loans on four-year transfer, the dataset does not capture students' enrollment outcome from the transfer-receiving institution. Understanding the characteristics of transfer borrowers that did, and did not, earn a bachelor's degree is a topic for future research.

Another potential limitation is the smaller sample size of college-ready students. Propensity score matching methods applied to smaller samples (n<500) are less predictable in reducing bias (Padgett, Salisbury, An, & Pascarella, 2010). There were 726 college-ready students included in this study, which is above the recommended threshold; however, the standard errors associated with the college-ready ATE are large, resulting in more uncertainty and less statistical power. The smaller sample size of college-ready students may limit the ability of this analysis to detect differences by borrowing status. Although to understand if a differential treatment effects exist the application of propensity score matching within sub-groups is the appropriate technique (Reynolds & DesJardins, 2009).

Results

Who Borrows?

Table 2 presents results for the chi-squared and t tests that addressed the first research question. There were some similarities in borrower characteristics across both sub-groups (gender, race/ethnicity, age, pre-college preparation) and a notable difference (gender). Within the Dev Ed group, females had greater representation among borrowers than among non-borrowers, but this was to a lesser extent among the college-ready students. For example, there was nearly a 10 percentage point difference in female representation by borrowing status for the Dev Ed students (73% compared to 64% college-ready) and only a four percentage point difference for the college-ready students (59% compared to 55%).

Table 2: Descriptive Statistics by Borrowing Status and Academic Preparedness

	Developmental Education			College-Ready		
	Borrower (n=418)	Non-Borrower (n=2021)	Statistic[1,2]	Borrower (n=130)	Non-Borrower (n=596)	Statistic[1,2]
Gender (%)						
Male	26.56	36.47		40.77	44.97	
Female	73.44	63.53	15.00*	59.23	55.03	0.76
Ethnicity (%)						
White	12.68	7.52		15.38	12.75	
Hispanic	13.40	39.14		10.77	30.54	
African American	64.59	37.31		56.15	28.52	
Asian	3.83	9.70		6.92	17.62	
Other	5.50	5.50	152.59*	10.77	10.57	48.13*
Age (Average)	24.8	21.5	9.75*	27.9	24.3	4.13*
First-Generation College (%)						
Yes	36.84	37.95		31.54	32.05	
No	63.16	62.05	0.18	68.46	67.95	0.01
EFC (Average)	1,345.0	1,591.8	1.54	1,308.6	2,117.4	1.23
Pre-College Preparation (%)						
GED/Other	16.75	10.69		16.93	11.24	
High School Diploma	83.25	89.31	13.92*	83.08	88.76	7.54*
Program of Study (%)						
Academic	39.23	39.78		30.77	36.58	
Vocational/Technical	60.77	60.22	0.04	69.23	63.42	1.57
Enrollment Intensity (%)						
Full Time	49.04	45.52		59.23	55.03	
Part Time	50.96	54.48	1.73	40.77	44.97	0.76
Federal Debt (Average)	8,251.6			9,381.1		

[1] Chi-squared is reported for the categorical variables and a t-statistic is reported for the continuous variables

[2] *Indicates when the proportion or average is statistically different ($p<.05$) for borrowers compared to non-borrowers within each sub-group.

Among both sub-groups, Hispanic and Asian students were less likely to borrow and African American students were more likely to borrow. For example, African American students were a majority (64% Dev Ed and 56% college-ready) among the borrowers, but represented only 37% and 28% of the non-borrowers. Conversely, Hispanic students were 13% of Dev Ed borrowers, but 39% of the non-borrowers. Compared to non-borrowers, a higher proportion of borrowers in both sub-groups was older and had obtained a GED rather than a high school

diploma. Borrowers in the Dev Ed group had an average cumulative debt burden of $8,252, compared to $9,381 for college-ready borrowers.

Dev Ed Borrowers Who Drop Out

The second research question aimed to identify the characteristics of Dev Ed borrowers who dropped out (see Table 3). Discouragingly, 63% of the Dev Ed students who took out a federal loan had not earned a credential from UCC or transferred to a four-year institution within six years of initial enrollment. Compared to borrowers who earned a UCC credential and/or four-year transferred, Dev Ed borrowers who were enrolled part-time, first-generation college, and GED holders were overrepresented among the dropouts. The average cumulative federal loan debt burden for Dev Ed borrowers who dropped out was $7,145, compared to $10,121 for the successful Dev Ed borrowers.

Table 3: Characteristics of Unsuccessful and Successful Dev Ed Borrowers

	Dropped Out (n=263)	Successful (n=155)	Statistic[1,2]
	Percentage with Attribute (%)		
Female (male)	74.19	73.00	0.07
Ethnicity			
White	13.69	10.97	
Hispanic	12.93	14.19	
African American	65.78	62.58	
Asian	1.90	7.10	
Other	5.16	5.16	7.77
Age (Average)	25.3	24.0	1.75
First-Generation (no)	40.68	30.32	4.50*
EFC (Average)	1275.80	1462.5	-0.28
GED (HS diploma)	15.59	9.03	10.61*
Program of Study (Technical)	38.40	40.65	0.21
Enrollment Intensity(Part-time)	45.25	55.48	4.09*
Federal Debt (Average)	7,145	10,121	3.88*

[1] Chi-squared is reported for the categorical variables and a t-statistic is reported for the continuous variables

[2] * Indicates when the proportion or average is statistically different ($p<.05$) for borrowers compared to non-borrowers

Impact of Loans on Persistence, Program Completion, and Four-Year Transfer

The final research question was addressed by comparing the enrollment outcomes of borrowers to non-borrowers within, and between, the Dev Ed and college-ready sub-groups. Table 4 presents the unadjusted differences between borrowers and non-borrowers on the four dependent variables. These observations are prior to the propensity score matching, so they do not account for differences in students' demographic characteristics and academic experiences. As expected, a higher proportion of the college-ready students achieved each of the enrollment outcomes, compared to the Dev Ed students. For the college-ready sub-group, borrowers had higher observed rates of success than non-borrowers for three (i.e., completing 15 SCH, completing 30 SCH, earning a credential from UCC) of the four outcome measures. Among the

Dev Ed students, however, borrowers had a lower observed rate of success than non-borrowers for these three outcomes, but a slightly higher observed rate of four-year transfer.

Table 4: Unadjusted Comparisons of Student Persistence, Borrowers vs. Non-Borrowers

	Completed 15 Credits		Completed 30 Credits		Earned UCC Award		4-Year Transfer	
	Dev Ed	College Ready	Dev Ed	College Ready	Dev Ed	College Ready	Dev Ed	College Ready
Borrowers	63.6%	70.8%	42.1%	50.8%	14.4%	29.2%	30.6%	34.6%
Non-Borrowers	63.8%	66.9%	44.2%	48.8%	15.8%	22.5%	25.6%	34.9%
Difference[1,2]	-0.1%	3.8%	-2.1%	1.9%	-1.5%	6.7%	5.0%	-0.3%
N for Borrowers / Non-Borrowers	418 / 2021	130 / 596	418 / 2021	130 / 596	418 / 2021	130 / 596	418 / 2021	130 / 596

[1] Average treatment effect among the treated, with standard error in parentheses

[2] *$p<0.05$

Table 5 presents the difference in enrollment outcomes for borrowers and non-borrowers among the two sub-groups after propensity score matching. Borrowers in the Dev Ed group had marginally higher rates of success in three (i.e., 15 SCH, 30 SCH, four-year transfer) of the four enrollment outcomes, but the only statistically significant difference was for four-year transfer. Dev Ed borrowers transferred to a four-year institution at a rate that was 6.2 percentage points higher than non-borrowers. For the college-ready group, borrowers had slightly higher levels of success across all four of the enrollment measures; although, the only statistically significant difference was for completing 15 SCH. College-ready borrowers completed 15 SCH at rate that was 12.1 percentage points higher than college-ready non-borrowers.

Table 5: Propensity Score Adjusted Comparisons of Student Persistence, Borrowers vs. Non-Borrowers

	Completed 15 Credits		Completed 30 Credits		Earned UCC Award		4-Year Transfer	
	Dev Ed	College Ready	Dev Ed	College Ready	Dev Ed	College Ready	Dev Ed	College Ready
Borrowers	63.6%	70.2%	42.1%	49.2%	14.4%	27.4%	30.6%	34.7%
Non-Borrowers	61.0%	58.1%	39.5%	38.7%	14.8%	19.4%	24.4%	29.8%
		12.1%		10.5%		8.1%	6.2%	
Difference[1,2]	2.6% (3.4%)	(6.1%)*	2.6% (3.4%)	(6.3%)	-0.5% (2.4%)	(5.4%)	(3.1%)*	4.8% (6.0%)
N for Borrowers / Non-Borrowers	418 / 418	124 / 124	418 / 418	124 / 124	418 / 418	124 / 124	418 / 418	124 / 124

[1] Average treatment effect among the treated, with standard error in parentheses

[2] *$p<0.05$

The propensity score adjusted results suggest there are some differential effects of borrowing as a function of students' level of academic preparedness. The majority of the differences in enrollment outcomes were positive for borrowers in the Dev Ed and college-ready

sub-groups compared to non-borrowers, but these differences are not large enough to be certain they are not attributed to chance. Across both sub-groups, borrowers did not have lower levels of success compared to non-borrowers, but students who took out federal loans also did not appear to be much more successful for most of the enrollment measures.

Discussion and Implications

Consistent with findings from nationally-representative data (Fernandez et al., 2014), Dev Ed students in our sample were as likely to have borrowed as their college-ready peers, and the average cumulative debt level was similar for both groups. After matching students who shared similar demographic characteristics and academic experiences, taking out a federal loan in the first year did not significantly improve Dev Ed students' likelihood of persistence or earning a certificate or associate degree. Most concerning is that about two out of every three (63%) Dev Ed borrowers in our sample had dropped out with debt and no degree, placing them at heightened risk for repayment hardships. The average debt level among these Dev Ed dropouts was $7,145, a level of debt burden which several studies (Campbell & Hillman, 2015; McKinney et al., 2014) have found is more than sufficient to trigger loan default among community college students.

Dev Ed borrowers in our study were slightly more likely (6 percentage points) to four-year transfer than non-borrowers. As previously noted, a limitation of our dataset is that it does not capture students' enrollment outcome from the transfer-receiving institution. But research shows that about 38% of community college students who vertical transfer do not earn a bachelor's degree within six years (Shapiro et al., 2013). Transfer borrowers who continue to assume more debt at the four-year institution risk experiencing even greater difficulty repaying their loans if they dropout without completing a bachelor's degree.

As with any financial investment decision, borrowing for college comes with varying levels of risk for each student (Avery & Turner, 2012). Unfortunately, the results of our study suggest that taking out a federal loan might not be a wise decision for many of the academically underprepared students at this community college. While our findings do not show that borrowing *causes* attrition among Dev Ed students, taking out a loan did not appear to help these students persist. College-ready borrowers had higher rates of persistence and four-year transfer than the Dev Ed borrowers, and were nearly twice as likely to have earned an associate degree or certificate from UCC. Loans appeared to have a differential impact on persistence for the Dev Ed and college-ready students because the ATE with significant differences varied between the groups. But overall, evidence that borrowing facilitated persistence for either group was weak. Most borrowers in our sample were unsuccessful, placing our findings alongside prior research that shows the costs of using loans outweigh the benefits for many community college students (Dowd & Coury, 2006; McKinney & Backscheider-Burridge, 2015).

Our conceptual framework (Chen, 2008) emphasizes the importance of examining differential effects of borrowing by race/ethnicity and income status. Consistent with prior research on debt aversion (Burdman, 2005; Cunningham & Santiago, 2008), Hispanic and Asian students in our sample were less likely to borrow. African American students in our study were more likely to borrow, a finding also congruent with prior literature (Hillman, 2015; Jackson & Reynolds, 2013). Borrowers in both sub-groups had an average EFC that was lower than non-borrowers. Even after receiving a federal Pell Grant, many lower-income students must resort to borrowing to afford community college (Campbell & Hillman, 2015; McKinney et al., 2015; TICAS, 2009). Additionally troubling is that overrepresented among the unsuccessful Dev Ed

borrowers were part-time students, first-generation college students, and GED holders, groups that have traditionally experienced high rates of non-success.

Given that dropping out before degree completion is such a strong predictor of loan default, and only a small proportion of Dev Ed community college students ever earn a credential, current policy allowing immediate federal loan access to these students may merit reevaluation. More evidence is certainly required before making changes to existing policy, as there is the real possibility that a student loan eligibility index (NASFAA, 2013) could hinder college enrollment among lower-income students. But federal loan guidelines were designed with four-year students in mind, and do not account for the considerable heterogeneity in college-readiness among community college students. One out of every five community college borrowers defaults within three years of entering repayment (Department of Education, 2015) and most defaulters have low levels of debt, were enrolled only brief period of time, and dropped out without a credential (Campbell & Hillman, 2015; Christman, 2000; McKinney, Gross, & Inge, 2014).

Loan default has serious consequences for borrowers and can result in the garnishment of wages, forfeiture of tax refunds, credit report damage, denial of a professional license, and ineligibility for federal student aid in the future (Gladieux & Perna, 2005). One problem with current federal loan policies is that most measures to reduce borrowers' financial hardships do not occur until after the student has accrued debt or is struggling to repay their loan. Some community colleges have taken this problem into their own hands. To protect students from loan default, about 235 community colleges have opted out of the federal loan programs entirely, making these loans unavailable to their students (Project on Student Debt, 2014). This is not the best solution, however, as some students simply could not to persist until graduation without

borrowing (McKinney et al., 2015). Ideally, loan policy would strike a balance between assuring college is financially accessible for all students, while providing some form of early protection for students at the greatest risk of non-success and future repayment hardships.

A student loan eligibility index would, in theory, address this policy goal by essentially introducing a form of risk underwriting on federal loans (NASFAA, 2013). For academically underprepared students attending community colleges, a sliding scale used to determine loan eligibility could include the following metrics: high school grades; whether the student earned high school diploma or GED; SAT/ACT score (for students who did take one of these exams); depth of academic deficiency (i.e., levels below college-level coursework in a given subject); breadth of academic deficiency (i.e., how many subjects – math, writing, reading – in which remediation is required); and placement exam scores. Students falling below a certain threshold on this index (e.g., a GED holder who earned a low C average in high school, required remediation in all three subject areas, and was referred to the lowest-level of developmental math) would not be allowed to take out a federal loan in their first semester of enrollment. Upon passing each of their first-semester courses, the student would be fully reinstated in the loan program when they enrolled for their second semester.

Future research should explore the potential benefits and intended consequences of a student loan eligibility index. So as not to discourage enrollment among students that would be affected by such a policy change, a critical next step would be to determine the respective role that borrowers, institutions, states, and the federal government should play in covering the costs of the loan amount that would be initially withheld. Research should examine the effects of borrowing on academically underprepared students in other contexts and using different datasets. Understanding how Dev Ed placement levels and course-taking impact loan default would be a

useful contribution to the literature. Given the abysmal rates of degree completion for students assigned to the lowest levels of developmental coursework (Bahr, 2010b; Bailey, Jeong, & Cho, 2010; Complete College America, 2012), studies could explore whether loans exert a differential effect as a function of borrowers' depth of academic deficiency.

In the absence of federal policies that better protect students at the beginning of the borrowing process, community colleges are tasked with identifying strategies to support their student borrowers. Financial literacy workshops, online loan entrance counseling, and default prevent committees are strategies that some colleges have found to be effective (Fernandez et al., 2015; McKibben et al., 2014; McKinney et al., 2015; TICAS, 2012). Due to their heightened risk for attrition, Dev Ed borrowers may require more intensive and proactive financial aid counseling than college-ready students. Embedding information about loans (e.g., interest rates, repayment terms) into developmental math coursework could also help these students make better borrowing decisions (Steiner & Barone, 2014).

Conclusion

Federal student loans and developmental education share a common underlying purpose: to equalize college opportunity and attainment between the advantaged and disadvantaged. But unfortunately, research shows that relative to their more advantaged peers, lower-income and racial/ethnic minority students are less likely to benefit from taking out a loan or participating in developmental coursework. Consistent increases in student borrowing, coupled with a larger proportion of students lacking college-readiness, suggest the rates of loan use and debt burden among academically underprepared students will only increase. There are important, difficult questions to consider about the wisdom of placing these students immediately into loan debt, knowing their prospects of successfully navigating a Dev Ed system described as a 'bridge to

nowhere' (Complete College America, 2012) are not favorable. Policymakers, researchers, and institutions must work together to develop loan policies that maintain access to college and a postsecondary credential for all students, while better protecting the most disadvantaged populations from the long-term negative consequences of loan default.

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