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Project Description I

Title:

College on credit: student and institutional factors associated with default

Statement of the research problem and national importance:

Overview
This study employs a multilevel regression model to identify student and institutional characteristics associated with student loan default. To address this topic, it will merge Beginning Postsecondary Students 2004/2009 (BPS:09) data with IPEDS as has been done in previous multilevel analyses (Carter, 1999; S. R Porter, 2006; Titus, 2006). The study examines students who began college in 2003-04 and borrowed student loans at any point in their educational careers. Among those who borrowed, the proposal asks "to what extent are socioeconomic, academic, or demographic student characteristics associated with defaulting on student loans?" Similarly, it asks, "to what extent are institutional characteristics and college financial and human resources related to default rates?"

Problem Statement & Context
These questions have generated a considerable amount of national attention during the past year, particularly among the for-profit sector which has been under scrutiny for having the highest default rates of all institutional types (Field, 2010; Kutz, 2010). However, the academic community has yet to fully explore the relationship between students, institutions, and default (Gross, Cekic, Hossler, & Hillman, 2009). Perhaps more importantly, the small body of research exploring default trends has not employed multilevel techniques that partition the variance between students and institutions. The purpose of this proposed study is to fill this research gap. It also seeks to inform policy and practice associated with the steps institutions and students might be able to take to reduce default risks.

Recent events in the U.S. economy have intensified public policymakers and university leaders' concern over rising student debt levels. The graduating class of 2009 owed an average of $24,000 in loans, which is a 6 percent increase from 2008 levels (Cheng & Reed, 2010). This figure varies across institutional sector, control, and type, as well as across student socio-demographic characteristics (Baum & Steele, 2010), but the pattern remains the same – students are becoming increasingly reliant on loans to fund their educations. Debt alone is not necessarily a policy problem; but when debt becomes excessive, unmanageable, or results in default then it raises questions about the efficacy of financing college on credit. The national student loan default rate has steadily risen since the mid 1990's and the most recent data shows that one in ten borrowers (11.8%) who entered repayment in 2007 defaulted on their loans within three years (U.S. Department of Education, 2010). This is not only a strain on our collective national resources, but it has serious implications for students and institutions alike. The public policy problems associated with default is a stick that can be picked up from either end. On the institutional side, colleges must manage their "Cohort Default Rates" (CDR) and the Higher Education Opportunity Act of 2008 requires institutions to maintain a CDR below 30 percent. Those with CDR's beyond this threshold for three consecutive years (or 40% in any given year) will face Title IV funding sanctions. For many for-profit colleges, this is a significant policy concern as Title IV funding makes up a large proportion (sometimes as high as 90%) of their revenue streams (Scott, 2010). On the student side, the bleak job market makes it difficult for college graduates to make on-time payments to their loans after college. For those who accumulate debt without earning a degree, the risk of defaulting may be even more profound (Gladieux & L. Perna, 2005). Student loans generally cannot be discharged in bankruptcy, and those who are in default may experience any of the following: wage garnishment, seized tax refunds, collection costs, litigation, diminished credit ratings, and ineligibility from additional Title IV aid. Students are accumulating increasingly "high" levels of potentially unmanageable debt, which is a burden that disproportionately falls on individuals from lower-income and minority backgrounds (Baum & Steele, 2010). Considering recent economic and employment trends, we can expect public policymakers to continue their interest in these problems.

National significance and timeliness
In 2010, the issue of student loan default gained significant national attention in Congressional hearings and within the higher education policy community. This heightened visibility was due to a number of such factors as investigations into for-profit marketing practices, policy changes with the CDR measurement, growing uncertainties over the ongoing credit crisis, economic downturn, and "gainful employment" of college graduates. While the policy community has grown increasingly concerned about default risk, there has been surprisingly little academic inquiry into the matter.

Review the literature and establish a theoretical grounding for the research:

The Gross, Cekic, Hossler, and Hillman (2009) literature review serves as an invaluable overview of findings from prior research on the student loan default problem. The authors limited their review to studies that employed multivariate methods using national databases; only those analyses published in peer-reviewed academic journals between 1978 and 2007 were included. Among the 31 citations included in their literature review, 20 were published after 2000 and almost all examined students as the primary unit of analysis. Very few studies identified institutional characteristics (beyond sector and control) that were associated with default.

To identify institution-level characteristics associated with default, I focus attention on policy research organizations and reports from the U.S. Department of Education, Congressional hearings, and the GAO. Unfortunately, few peer-reviewed works have explicitly examined a range of institution-level factors associated with defaults (Volkwein & Szelest, 1995). One of the most common institutional factors associated with default is "for-profit" status. Students enrolled in for-profit institutions make up 10 percent of total student enrollment, yet they account for

nearly half of all student loan defaults (Asher, 2010). These institutions have been criticized for exploiting non-traditional (e.g. single parent, military veteran, lower-income, unemployed, and minority) students in order to benefit from the associated tuition revenue (Kutz, 2010). While for-profit colleges account for a large proportion of institutional "types" with default rates, they are not alone in the problem of debt management. Historically Black Colleges and Universities, community colleges, and a growing number of four-year institutions (both public and private) are also experiencing gains in their CDR's (Dillon & Smiles, 2010; Field, 2010).

Studies of the affect colleges have on students may also yield valuable insights into the role colleges play in helping students avoid default. Variables such as institutional selectivity and control (Kim, 2007; Thomas, 2003), financial resources and tuition, and program offerings (Price, 2004; Rothstein & Rouse, 2007) are common institutional characteristics related to student debt burdens. So, it is possible that some of these variables also impact default rates. Evidence about which specific institutional characteristics are the strongest predictors of defaulting is lacking (Guryan & Thompson, 2010), although some institutions have made significant strides in managing default rates (Dillon & Smiles, 2010). Therefore, I plan to explore a range of institution-level factors that may account for some of this institution-level variance.

When shifting the unit of analysis to students, a different (and clearer) set of variables emerge in relation to defaults. Gross et al. (2009) classify these student-level characteristics into three general categories: demographic variables, socio-economic variables, and academic characteristics.

Demographic: Greene (1989), Herr & Burt (2004), Setiner and Teszler (2005) and Harrast (2004) found that African American students tend to have greater default rates than white peers. A borrower's age and gender also have been found to be associated with default, but the evidence is mixed on the nature of this relationship. Christman (2000), Harrast (2004), Herr & Burt (2004), and Woo (2002) found age to be positively associated with default while Steiner and Teszler (2005) found the opposite pattern. Woo (2002) and Podgursky et al. (2002) found men to default at higher rates than women, but other researchers have found no relationship between gender and default (Harrast, 2004; Volkwein & Szelest, 1995).

Socio-economic: The following socio-economic factors have been found to have positive associations with defaulting: number of dependent children (Dynarski, 1994; Volkwein, Szelest, Cabrera, & Napierski-Prancl, 1998); having access to external financial support (Woo, 2002); being a first-generation and/or lower-income student (Baum & Steele, 2010; Kesterman, 2006; Steiner & Teszler, 2005) and higher monthly repayment level relative to income (Dynarski, 1994; Kantrowitz, 2010; Schwartz & Finnie, 2002).

Academic: Gross et al. (2009) found enrollment intensity, degree completion, academic preparation, and post-college earning to be significant predictors of default. Students who enroll full-time (Choy & Li, 2006), earn a degree (Knapp & Seaks, 1992; Volkwein & Szelest, 1995), and have higher standardized test scores and GPA's (Baum & O'Malley, 2003; Volkwein et al., 1998) are less likely to default on their student loans.

Conceptual framework:
The conceptual model draws upon two microeconomic theories. For understanding student-level factors associated with default, it draws upon human capital theory and for institution-level factors it will draw upon theories of firm behavior. For students, the decision to invest in higher education is one that weighs the perceived costs and benefits accrued through the educational process. These outcomes are unknown in advance (Becker, 1993) and it is possible that students borrow more money than they are able to repay. Borrowers can only repay their debts in accordance with their budget constraints, so when a repayment plan falls beyond an efficient budget line, a borrower may face the unintended consequence of defaulting. These decisions are conditioned by various socioeconomic, demographic, and academic factors in addition to their financial needs while enrolled in college (DesJardins, Ahlburg, & McCall, 2006; Goldrick-Rab, Harris, & Trostel, 2009; Hossler, Ziskin, Gross, S. Kim, & Cekic, 2009; St. John, 2000). Economists in higher education have developed diagrams for understanding budget constraints, which will be useful in developing the proposed analysis (DesJardins & Bell, 2006; Paulsen, 2001; Paulsen & Toutkoushian, 2008). For the institution-level, theories of firm behavior are utilized to guide the conceptual model. Firms (e.g. colleges and universities) operate in quasi-markets where they must compete for resources such as funding, students, faculty, and other various indicators of reputation or market position (Brewer, Gates, & Goldman, 2002; Lane & Kivisto, 2008; Winston, 1999; 2004). There is a wide variation in these "markets," where public subsidies, endowments, tuition levels, academic and financial resources, and even financial aid packages vary considerably across institutional control, sector, and type (Heller, 2001; 2006; Lane & Kivisto, 2008; St. John, 2003). Accounting for the wide variation in institutional missions and markets may help us understand the patterns of default trends across various institutional types rather than focusing solely on student-level characteristics.

Describe the research method that will be used:

The primary outcome of interest is the repayment status of loan borrowers after they depart from college:

1) To what extent do academic, financial aid, socio-economic, and demographic characteristics of students who default on their student loans systematically differ from all other repayment statuses?

2) To what extent are there systematic differences among institutional financial, academic, and control/affiliation characteristics associated with defaulting, as compared with all other repayment statuses?

Data
The Beginning Postsecondary Students survey (2009) and IPEDS serve as the data sources for this study. BPS can be used in longitudinal studies of student enrollment patterns, but it can also be utilized to examine post-enrollment outcomes. Additionally, BPS includes various years of NPSAS data, making this an appropriate dataset to use for this analysis. Default can occur at any time after college departure, but this analysis

is interested in the characteristics of those who default within three years of departure (ENDTLA6Y).

Multinomial outcome
Borrowers experience any one of five repayment statuses associated with their debt burdens:
A) Default
B) Standard repayment (makes routine on-time payments)
C) Emergency protection (economic hardship deferment or forbearance)
D) Not yet in repayment (in grace period)
E) Successful repayment (loan obligations have been fully repaid)

A multinomial logistic regression model will aid in accomplishing these comparisons, as it allows model outcomes to take on more than two categories (Long, 1997). Binary outcomes have been the most common analytical technique for studying default (Herr & Burt, 2004; Podgursky et al., 2002; Steiner & Teszler, 2005; Volkwein & Szelest, 1995; Volkwein et al., 1998); however, multinomial outcomes have yet to be analyzed. Multinomial outcomes are expressed as:

$$\ln[(\Pr \ (A|x))/(\Pr \ (B|x))]= \beta\_{(0,A|B)}+ \beta\_{(1,A|B)} \ \chi+\varepsilon\_i$$

Where Pr is the probability of experiencing one of the following aforementioned outcomes (A, B, C, D, and E), $\ln(\Pr A|x/\Pr B|x)$ is the log odds ratio, β is the parameter estimate for X, and ε is the standard error. Four models will be included in this analysis: Model 1 compares standard repayment to default; Model 2 compares emergency protection to default; Model 3 compares not yet in repayment to default; and Model 4 compares successful repayment to default. Models 1 and 2 will be the primary models of interest.

Multilevel methods
Since students are nested within institutions, a multilevel model will be used as in previous studies of BPS survey data (Carter, 1999; S. R Porter, 2006; Titus, 2006). Higher education researchers have become increasingly interested in multilevel models and some have even applied multinomial outcomes to multilevel models (Hu & Kuh, 2002; Perna & Titus, 2005; Rhee, 2008). By partitioning the variance among student-level and institution-level variables, in addition to comparing multiple categorical outcomes, a multinomial multilevel model offers advantages over traditional single-level OLS regression design.

The multinomial multilevel model is expressed in the following equation, where level 1 represents the student-level and Level 2 represents the institution-level variables.

Level 1:
$$\ln[(\ \llbracket \Pr \rrbracket \_{(ij(A))} \ )/ \llbracket \Pr \rrbracket \_{(ij(B))} \ ]= \beta\_{0j}+ \beta\_{1j}*(SES)\_{ij}+ \beta\_{2j}*(AID)\_{ij}+ \beta\_{3j}*(DEM)\_{ij}+ \beta\_{4j}* \llbracket (ACAD) \rrbracket \_{ij}$$

Subscript i denotes the student, j denotes the institution. SES represents the vector of socio-economic variables (e.g. parental education level, family income level, etc.); AID represents financial aid packaging (Pell status, indebtedness, etc.); DEM represents demographic variables (e.g. race, gender, age, etc.) and ACAD represents the academic variables (e.g. enrollment intensity, transfer status, choice of major, degree completion, pre-college achievement, etc.). The variable list in the following section will highlight the specific variables I seek to explore in this analysis. β_{oj} is the intercept which is allowed to vary across institution type while all other beta-parameters will be fixed and group-mean centered (Raudenbush & Bryk, 2002).

Level 2:
$$\beta\_{0j}= \gamma\_{00}+ \gamma\_{01}*(FIN)+\gamma\_{02}*(ACAD)+ \gamma\_{03}*(AFFIL)+\mu\_{0j}$$
$$\beta\_{kj}= \gamma\_{(k0(a))} \ \ k=1,2,\ldots n \ \text{(final number of level 1 variables)}$$

Where subscript j denotes the institution and $\beta_{oj(a)}$ denotes the average default rate for a particular institution. $\gamma00$ represents the average default rate for all institutions, and parameter estimates for FIN, ACAD, and AFFIL represent the impact financial resources (FIN), academic/human resources (ACAD), and affiliations (AFFIL) such as sector and control have on various repayment outcomes. The variable list in the following section will highlight the specific variables I seek to explore in this analysis.

Results will be presented for all four Models and odds-ratios will be converted using delta-p calculations (Cruce, 2009).

Power, sample, and assumptions
Single-level regression models are built on an assumption that individuals within the sample share no common characteristics with one another or with overarching structures or groups (Heck & Thomas, 2008). This assumption is often referred to as "independence of error terms" which requires all of the residual values to follow no systematic patterns and then all "macro-level" influences that exist would be incorporated into the error term. If macro-level characteristics do indeed influence individual-level outcomes, single-level models will be unable to accurately identify them. By using a single-level model that assumes independence of error terms, one will over-estimate the model and perhaps commit Type 1 error (Tabachnick & Fidell, 2006).

When using multilevel models, correlation among predictor variables can be more problematic than in single-level designs because the model adjusts for the effects of correlated predictors resulting in few statistically significant coefficients. As a result, Tabachnick & Fidell (2006) recommend selecting a small number of uncorrelated predictors for the regression model. After exploring the descriptive statistics and running correlation matrices, I will be able to select the most appropriate predictor variables for this model to avoid this potential problem. Centering

techniques and build-up strategies (Raudenbush & Bryk, 2002) will be used. Texts on multilevel modeling recommend having at least 30 to 50 groups and at least 10 cases per group in order to have sufficient power (Hox & Maas, 2004; Porter, 2005). Cautions regarding clustering and weights when using NCES datasets will be addressed (Thomas & Heck, 2001; Thomas, Heck, & Bauer, 2005).

Model implementation
STATA (11.0) statistical software is capable of implementing multilevel models. Specifically, this study will utilize the GLLAMM (generalized linear latent and mixed models) command to handle the multinomial multilevel design.

Uploaded Appendix Document(s):

Project Description II

Will you use NCES target dataset? Yes

Please check all NCES datasets that apply
- Beginning Postsecondary Student (BPS) Longitudinal Study
- IPEDS 12-Month Enrollment (E12)
- IPEDS Fall Enrollment (EF)
- IPEDS Finance (F)
- IPEDS Human Resources (HR)
- IPEDS Institutional Characteristics (IC)
- IPEDS Student Financial Aid (SFA)

Explain why each dataset best serves this research. Include a variable list for each dataset used.

Data and variables
Beginning Postsecondary Students (2009) and IPEDS. Data from students' 2009 responses within BPS are the primary variables of interest. Student data will be linked with IPEDS "unitid" variable in order to create the Level 2 equation described in the multilevel model. Limitations in data availability are bound to exist, so efforts will be made to account for missing data and to explore alternative variables to those listed below.

Outcome
LOANST09

Predictors (student-level)
** Demographic: RACE, AGE, GENDER, DEPANY09 (number of dependents), SMAR09 (marital status)
** Socioeconomic: PAREDUC, CAGI (parent's income), INCTOT08 (household income), UNTAX09 (untaxed benefits)
** Financial aid: CUMOWE09 (cumulative owed), CUMULN09 (cumulative borrowed), LNTY09A (federal loan), LNTY09B (private loan), RPYAMT09 (monthly loan repayment amount), DEPEND (dependency status), LNHELP09 (external help with loan payments), PELLCONT (ever received Pell).
** Academic: TESATDER (SAT/ACT score), HCGPAREP (high school GPA), ENDTLA6Y (date of last enrollment), UGDE09 (degree program when last enrolled), GPA09, MAJ09B (major), ENINPT6Y (enrollment intensity), ENINUM6Y (number of institutions attended), AT1TY6Y (first degree type), SAMESTAT (residency).Employment & finances: UNEMPD09 (date last employed), UNEMPX09 (unemployment status), JOBEMP09 (job type), VETERAN (veteran status)

Predictors (institution-level)
** Institutional Characteristics: UNITID, OPEFLAG, SECTOR, DEGGRANT, CCBASIC, CHG1AY3, CHG2AY3, CHG3AY3.
** Enrollment: FTE, undergraduate enrollment by race/ethnicity (EFRACE), selectivity
** Finance: Tuition, Net tuition revenue (F1B01, F2D01, F3D01) relative to total revenue (F1D01, F2D16, F3B01), institutional aid expenditures (IGRNT_N, IGRNT_A), and per-student E & G expenditures.
** Human Resources: Percent of faculty tenured or on tenure track; faculty/FTE ratio

Will you use NSF target dataset? No

Explain why each dataset best serves this research. Include a variable list for each dataset used.

Will you address the NPEC focus topic? Yes

If yes, please briefly describe:
When a student loan borrower is able to repay his/her education debt without entering into default, this can be viewed as a higher education "success" story. Perhaps in a perfect world, no student would default on their loans and none would be financially burdened for pursuing higher education. However, this is not the world in which we live. One in every ten borrowers will default on their loans within three years of repayment and this is not a trend that will likely reverse on its own. Successful repayment is a shared responsibility between students and the institutions in which they enroll. Understanding these post-enrollment measures of "financial success" is a direction in which research has not yet fully explored.

Project Description III

Provide a timeline of key project activities:

June-August, 2011
Secure data license and install data on stand-alone machine.
Data cleaning and descriptive analysis.
Begin drafting literature review and methods portions of manuscript.

August-September, 2011
Commence data analysis and model specification.
Begin preliminary interpretation of results.

October-December, 2011
Continue data analysis.
Begin drafting findings portion of manuscript.
Mid-year progress report to AIR due in December.
Submit conference proposal for AERA.

January-April, 2012
Finalize the draft version of the manuscript including results and implications.
Attend AERA conference and solicit manuscript feedback.
Contact NASFAA (National Student Financial Aid Administrators) and National Student Clearinghouse representatives to solicit feedback and interest in the findings.
Submit final manuscript to Research in Higher Education.

May, 2012-June, 2012
Submit final report to AIR and NCES staff.
Present at AIR Annual Forum.
Prepare press release.

List deliverables such as research reports, books, and presentations that will be developed from this research initiative:

In addition to the presentation at AIR's annual conference, this proposal offers a manuscript targeted at publication in *Research in Higher Education*. My graduate assistant and I will prepare a proposal for AERA's annual conference, where we will present our preliminary findings and solicit peer feedback. The presentations will be made available on the University of Utah's website in addition to the AERA and AIR websites. We also plan to contact NASFAA and the research staff at the National Student Clearinghouse to share results and to discuss potential for further research. As a junior faculty member on the tenure track, I intend to use this research opportunity to build my capacity for conducting more national analyses using NCES databases.

Describe how you will disseminate the results of this research:

Due to the research and policy implications of this proposal, results will be shared among academic and policy communities. Results will be shared with the AERA and AIR research communities at each association's annual conference. The final study will be submitted for publication in *Research in Higher Education*, where it can reach a wider audience of researchers and practitioners. Results will also be shared with professional contacts at NASFAA and the National Student Clearinghouse, and potentially with other policy stakeholders such as the American Association of State Colleges and Universities in the Washington, D.C. metro area. The University of Utah's College of Education media representative, Clifford Drew, will assist with press releases to national and regional news outlets.

Provide a reference list of sources cited:

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IRB Statement

Statement of Institutional Review Board approval or exemption:

I will submit an IRB request to the University of Utah in February, 2011. Upon approval (likely by April), I will submit a request to NCES for the BPS data license.

Statement of Use of Restricted Datasets

This proposal will require the use of the Beginning Postsecondary Students survey (2004/09). I will request a license to this data during the spring of 2011, and will anticipate starting on data analysis by June, 2011. Preliminary descriptive statistics can be explored using NCES PowerStats, but the statistical method used in this analysis will require the restricted dataset. Upon receiving the data, all stewardship and licensure guidelines will be followed accordingly. I will also expect my graduate assistant to add herself to my license.

Biographical Sketch

Nick Hillman's Biography Sketch

Nick Hillman is an Assistant Professor of Educational Leadership & Policy at the University of Utah. Dr. Hillman earned his PhD in Higher Education Policy Studies from Indiana University in 2010, where he also completed his post-master's certificate in institutional research. Professor Hillman teaches courses in higher education budgeting and planning, as well as higher education finance and policy. His research interests include state and federal higher education finance, college costs and affordability, financial aid policy, and educational equity. Dr. Hillman's research agenda explores the implications associated with how financial benefits and burdens are distributed among various stakeholders within the higher education enterprise. It also aims to understand how student enrollment decisions and affordability outcomes are impacted by these trends.

Professor Hillman's work has been published in the *Journal of Student Financial Aid, Tertiary Education and Management*, and the *Community College Journal of Research and Practice*. He has also presented his research at the Association of the Study of Higher Education, the Association for Institutional Research, and the European Higher Education Society annual conferences. Professor Hillman's professional experiences include research and policy analysis with state and national higher education organizations, including State Higher Education Executive Officers (SHEEO) and the American Association of State Colleges and Universities (AASCU). He has also worked in institutional research at the campus/system level. Professor Hillman earned his Master's in Public Affairs from Indiana University, where he studied public finance and public policy analysis and was a McNair Scholar and NCES/AIR Fellow.

Dr. Hillman has participated in the AIR/NSF/NCEF summer Data Policy Institute in Potomac, Maryland where he gained valuable experience working with national NCES and NSF datasets. He has participated in AIR pre-conference workshops on HLM and the University of Michigan's Inter-university Consortium for Political and Social Research (ICPSR) seminar on panel data analysis. His research integrates econometric modeling into the study of higher education finance, financial aid, and enrollment management. He is a co-author of the comprehensive literature review that serves as a framework for this

research proposal (Gross et al., 2009) and he is establishing a research agenda that integrates econometric methods with contemporary public policy issues such as student loan default, revenue generation, and tuition discounting.

Budget Requirements

Nick Hillman' Budget

Personnel-Time on Project
%(FTE) Academic Year: 11.00
%(FTE) Summer: 22.00

Personnel-Salary & Benefits
Academic Year: $ 80000.00
Summer: $ 15000.00

Graduate Research Assistant's Budget

Personnel-Time on Project
%(FTE) Academic Year: 50.00
%(FTE) Summer: 0.00

Personnel-Salary & Benefits
Academic Year: $ 30000.00
Summer: $ 0.00

Total Salary and Wages: $27100.00

Travel: $5000.00
Other travel related expenses: $5000.00
Other research expenses: $2000.00
Total Request: $39100.00

Funding History

This study does not utilize any prior, current, or pending funds. Dr. Hillman has received prior funding from AIR unrelated to this proposal. As a graduate student, he received an AIR Fellowship and also assisted Dr. Ty Cruce on his 2009 AIR-funded proposal which met all of its scheduled objectives.