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Proposal Details

Personal Information

Name	Ms. Jin Chen
Informal Name	Jin
Institution / Affiliation	Indiana University-Bloomington
Unit / Department	Educational Leadership and Policy Studies
Title	Ph.D. Student
Preferred Mailing Address	2100 E Lingelbach Ln, Apt 406
City	Bloomington
Country	United States
State	Indiana
Zip/Postal Code	47408-2276
Email	chen92@umail.iu.edu
Phone	812-857-6753
Fax	

Faculty Advisor

Name	Dr. Donald Hossler
Informal Name	Don
Institution / Affiliation	Indiana University Bloomington
Unit / Department	Educational Leadership and Policy Studies
Title	Professor
Preferred Mailing Address	201 North Rose Avenue, Wright Education Building Room 4268
City	Bloomington
Country	United States
State	IN
Zip/Postal Code	47401
Email	hossler@indiana.edu
Phone	8128568391
Fax	

Financial Representative

Name	Ms. Marilyn F Gregory
Informal Name	Marilyn
Institution / Affiliation	Indiana University Bloomington
Unit / Department	Center for Postsecondary Research
Title	Financial Manager
Preferred Mailing Address	1900 East Tenth Street Eigenmann Hall Suite 416
City	Bloomington
Country	United States
State	IN
Zip/Postal Code	47406
Email	mfgregor@indiana.edu

Phone   8128551755
Fax

Project Description I

Title:

Traditional Ways of Meeting Nontraditional Needs: How Financial Aid Serves Nontraditional Students and Affects Their College Success

Statement of the research problem and national importance:

Since the 1970s, nontraditional undergraduates increasingly outnumber their traditional counterparts who enroll in college full-time immediately after high school (Horn & Carroll, 1996; Clinedinst, Cunningham, & Merisotis, 2003). In the late 1990s, 40% of undergraduates were 25 years old or older, while as large as 73% were nontraditional in some way (Choy, 2002; Horn & Carroll, 1996). Up in 2008, 37% of all undergraduates attended higher education with part-time status, 40% were aged 25 or older, and 47% were financially independent (National Center for Educational Statistics (NCES), 2011, table 240). However, large disparities remain in college attainment between nontraditional and traditional students, the former facing a greater risk of dropping out and failing to receive a college degree in a timely manner (Greene & Greene, 2002; Taniguchi & Kaufman, 2005; Horn & Carroll, 1996).Studies on college completion reveal an alarming picture in which nontraditional students are constantly outperformed by traditional students especially in first-year persistence (Horn & Carrol,1996), and nontraditional students generally fall short of postsecondary credentials. For example, among adult students who initially enrolled in higher education institutions in 1995-96, 84% of certificate seekers earned a certificate by 2001, while only 15% of associate degree seekers and 10% of baccalaureate degree seekers achieved the diplomas they aspired for (Paulsen & Boeke, 2006). The disparity in academic achievement is substantially attributable to insufficient financial resources acquired by and lack of financial assistance to nontraditional students (Long, 2009; Horn & Carroll, 1996; Jacobs & King, 2011). Nonetheless, little understanding has been achieved on the extent to which the U.S. financial aid system, originally designed for traditional students (Long, 2009), addresses the needs of nontraditional students and on how the system works and should work to function more effectively in promoting the college success of nontraditional students.

Given the prevalence of nontraditional students and their less than satisfactory achievement, a better understanding of the effects of financial aid on this population could be a critical step towards the president's goals on college completion. By targeting a period featuring increased fiscal constraints, the proposed study will provide evidence on how financial aid affects nontraditional student college outcomes, and thus inform policy makers and practitioners at different levels on which financial initiatives are likely to impact these underserved students. The results of the study will further our understanding of the effectiveness of current federal financial aid policy in addressing financial needs of students who fall out of the intent of the original policy design and contribute to the discussion of alternative ways of financing nontraditional students (e.g. current financial aid policy versus new programs exclusively designed for nontraditional students).

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

Research on traditional student college success abounds; however, only limited attention has been given to nontraditional students, let alone their educational attainment (Taniguchi & Kaufman, 2005). Studies that target nontraditional students mainly focus on enrollment patterns (e.g. Choy, 2002), specialized student service programs (e.g. Bauer, 1981; Hazzard, 1993; Mabry & Hardin, 1992; Spratt, 1984), or comparisons between student groups (Spitzer, 2000; Ratcliffe, 1981). Despite that individual/family background ((Bean & Metzner, 1985; Tinto, 1975; St.John, et al.; Perna, 2006), precollege preparation (Braxton, Sullivan, & Johnson, 1997; Bean & Metzner, 1985; St.John et al, 1996), educational aspiration(Bean & Metzner, 1985; Perna & Titus, 2005), and college experience (Bean & Metzner, 1985; Braxton et al, 1997; Cabrera, Nora, & Castaneda, 1993) are indispensable to understanding student success, compared to their traditional counterparts, nontraditional students are much more susceptible to factors external to the college environment (Metzner, 1984; Bean & Metzner, 1985), such as family responsibilities (Bean & Metzner,1985; Horn & Carroll, 1996), employment (Nora, et al., 1996; Cabrera et al., 1993; St.John et al., 1996; Pike, Kuh, & McKinley, 2009), and financial constraints (Long, 2009; Porta-Avalos, 2008; Jacobs & King, 2002).

Although studies recognize the role of financial aid in increasing college access, choice and subsequent persistence in general (Cabrera et al., 1993; Nora, 1990; St.John, et al., 2000; Hossler, et al., 2009), they largely disagree on whether and how certain types of financial aid serve various needs of students as a whole or from heterogeneous groups. Across the few studies that focus on financial aid for nontraditional students, scholars agree that the current financial aid system fails to provide equal assistance to students with nontraditional status (Choitz & Widom, 2003; Long, 2009; Baum, 2006; Lapovsky, 2008). Facing substantial financial responsibilities but a limited availability of financial aid, many nontraditional students must borrow money in order to pursue higher education (Castellano & Overman, 2009).

The proposed dissertation utilizes a framework of integrated theoretical perspectives derived mainly from economics, sociology and psychology. Particularly, this study draws on human capital theory (Becker, 1975, 1964) to explain student college decisions as driven by financial factors. To address the common violation of model assumptions, variations of human capital theory that account for differential costs faced by students (e.g. direct and forgone, monetary and psychic) and imperfect market information are employed to advance the understanding of financial aid impact (Goldrick-Rab, Harris, & Trostel, 2009). Additionally, this study uses the market economy theory to affirm the part financial aid plays in removing the liquidity constraint that prevents individual optimal investment in higher education (Poterba, 1996) and to warrant the social provision of financial aid in addressing the positive externality of higher education (Long, 2007). The limitations of major economic models on financial aid impact necessitate the application of Bourdieu's (Bourdieu, 2011,1998,

2006) constructs of social capital, cultural capital and habitus that explain how social and cultural background as well as pre-college dispositions interact with student financial status to further shape their college decisions. Further, this study supplements the economic and sociological approach with Bandura's (1986) self-efficacy theory to understand the relationships between student financial perceptions, the educational expectations and behaviors (St.John et al., 1996; Cabrera, Stampen, & Hansen, 1990; Dowd, 2008), and with French, Rodgers and Cobb's (1974) coping behavioral theory to decipher the dynamic process in which students deal with evolving changes in the environment and personal traits(Folkman, 1992). The integration of economic, social and psychological theories is especially necessary to recognize the multilayered contexts and multiple forces that play a role in the longitudinal process of student success(Perna, 2006).

Describe the research method that will be used:

This study defines a nontraditional student as a student who demonstrates at least one of the following seven characteristics at first entry: delayed postsecondary enrollment, part-time attendance, financial independence, full-time employment, having a dependent other than a spouse, being a single parent, or lacking a standard high school diploma (Horn & Carroll, 1996). Using BPS: 04/09, the analytical sample is restricted to first-time degree seeking (i.e. certificate, Associate degree, or Baccalaureate degree) nontraditional students who started at either two-year or four-year institutions in 2003-04. Given the availability of financial aid data, this study will address two sets of research questions using the conceptual framework presented in figure 1 in appendix.

The first set of research questions center around student first year experience:

• To what extent does need-based financial aid affect nontraditional student first-year persistence (anywhere)?

• Do the effects of financial aid vary by type/package, by student nontraditional characteristics, or by institutional contexts?

The propensity score matching (PSM) will be employed to reduce observed biases associated with first-year financial aid status. Specifically, to examine the effect of need-based financial aid in general, recipients of need-based aid will be matched with unaided students on propensity scores estimated via binary logit models; while to examine financial aid effects by type, recipients of need-based grant only, students who borrowed, and work-study recipients who did not borrow will be matched with unaided students on propensity scores estimated via multinomial logit models (see figure 2 in appendix). Following Rosenbaum and Rubin's (Rosenbaum & Rubin, 1984, 1985) and Dehejia and Wahba's (1999) strategies of fitting the propensity score model, step-wise logistic regression will be used to select pretreatment covariates with significant main effects on the group membership. Aided and unaided students with similar propensity of receiving the treatment will then be matched. Multivariate analysis based on the matched samples will be conducted to determine treatment effects while controlling for student first-year experience.

Binary logit model for estimating conditional probability of receiving financial aid:

-------------------Here insert equation (1) ---------------------------------

Multinomial logit model with four categories of outcomes, namely, need-based grants only (j=1), loans in aid package (j=2), workstudy but no loans in aid package (j=3), and no aid (j=0):

-------------------Here insert equation (2) -----------------------------------

Matching Algorithm

Although there is no consensus on the best matching algorithm, to allow proposed multivariate analyses subsequent to matching, nearest neighbor matching within a caliper is used (Guo & Fraser ,2010):

---------------------Here insert equation (3) -----------------------------------

Post-matching Analysis

The effects of financial aid on first-year persistence are estimated using binary logit model on the matched samples, controlling for student first-year experience.

---------------------Here insert equation (4) ---------------------------------

Interaction terms between financial aid and nontraditional traits, or between aid and institutional covariates will be included in model (4) to test differential effects of aid.

The second set of research questions focus on student college outcomes within six years of initial enrollment:

• To what extent do Pell Grant, Federal subsidized and unsubsidized loans, respectively, affect nontraditional student college outcomes (i.e. completion, dropout, or continuous enrollment) over a six-year period?

• Do these effects vary over time, across nontraditional subgroups, or by institutions?

Multilevel event history analysis (EHA) with competing risks is proposed, because 1) EHA models the process of change, in other words, the temporal nature of student success; 2) the multilevel modeling techniques take into account the data structure where events are nested in students and students are nested in institutions, and partially controls for unobserved heterogeneity at both student and institutional levels by adding unit-

specific error terms to the model. The time-varying effects of aid are tested via including interaction terms between aid and discrete time period; the differential effects of aid across subgroups of nontraditional students are tested via including interaction terms between aid and individual nontraditional characteristics; and the institution-varying effects of aid are tested via including interaction terms between aid and institutional traits of interest.

The student level EHA model with three categories of outcomes, i.e. completed (j=1), departed without completion (j=2), or still enrolled (j=0):

------------------------Here insert equation (5) --------------------------------------

The EHA model with both student level and institution level covariates and error terms:

------------------------Here insert equation (6) --------------------------------------

Uploaded Appendix Document(s):

- Figures and Equations

Project Description II

Will you use NCES target dataset? Yes

Please check all NCES datasets that apply
- Beginning Postsecondary Student (BPS) Longitudinal Study and Transcript Data

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

This study will use the Beginning Postsecondary Student Longitudinal Study (BPS: 04/09) sponsored by NCES. BPS: 04/09 will best serve the purpose of this study, because 1) BPS contains a nationally representative sample that allows the generalizability of the study results; 2) BPS collects comprehensive information on student financial aid, demographics, educational goals, socioeconomic status and postsecondary pathways including persistence, completion and transitions to workforce, thus provides a unique opportunity to assess the role financial aid play in student college success; 3) the large sample size of BPS allows for application of the propensity score matching, while its longitudinal nature enables analysis on the temporal effect of financial aid; 4) and finally BPS: 04/09 reflects a time of drastic economic changes associated with increased fiscal constraints and is therefore timely for an examination of the efficacy and efficiency of financial aid policy.

Variables for this study include *college outcomes* (i.e. first-to-second year persistence/completion and six-year persistence/completion); *nontraditional characteristics* indicated by the seven risk factors; *individual/family background*, such as gender, age, race/ethnicity, (family) income and highest level of parental education; *precollege academic preparation* measured by high school grade point average, and SAT/ACT scores; *educational aspiration* measured by the highest level of education ever expected; *college experience* indicated by social integration, academic integration and college grade point average; *institutional context*, including institutional control, sector, and selectivity; *external factors*, such as hours of employment and having dependent children; *finances*, i.e. price of attendance and different types of financial aid; and *time in college*.

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? No

If yes, please briefly describe:

Project Description III

Provide a timeline of key project activities:

I have already received BPS: 04/09 data from the NCES and completed a comprehensive literature review on this research topic. My plan for conducting the research activities is as follows:

Spring 2012: complete data cleaning, descriptive analysis, write-up and oral defense of the dissertation research proposal, and causal analysis (PSM) of the financial aid impact on nontraditional student first year persistence; submit research proposal to the 2012 ASHE conference;

Summer 2012: descriptive analysis, causal analysis on the longitudinal impact of financial aid on college outcomes within six years of initial enrollment; submit research proposal to 2012 AERA annual conference;

Fall 2012: present research findings at the 2012 ASHE conference; submit research proposal to the 2013 AIR annual forum; submit the midyear progress report to AIR due on December 14, 2012;

Spring 2013: present research findings at the 2013 AIR annual forum; present research findings at the 2013 AERA conference; revise papers based on feedback received; final report to AIR due on June 30, 2013.

Summer 2013: deliverables to peer-reviewed journals, such as *Journal of Higher Education*, *Research in Higher Education*, and *Journal of Student Financial Aid.*

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

Presentations at the 2013 AIR forum; the 2012 ASHE conference; the 2013AERA conference;

Midyear and final reports to AIR;

Dissertation in both electronic form and paperback;

Submission of manuscripts to peer-reviewed journals such as *Research in Higher Education*, *Journal of Higher Education*, and *Journal of Student Financial Aid.*

Describe how you will disseminate the results of this research:

The results of this study will be disseminated via presentations at national conferences and journal publications. Conference proposals will be submitted to the annual forums of the Association for Institutional Research (AIR, 2013), the American Educational Research Association (AERA, 2013), and the Association for the Study of Higher Education (ASHE, 2012). The midyear and final reports will be submitted to AIR.

The dissemination of the research findings target a variety of audiences including higher education researchers, practitioners, and policy makers who share an interest in promoting college success of underserved or understudied students. Specifically, scholars interested in either causal inferences in observational studies or substantive issues of students success, practitioners managing financial aid programs or retention practices, and (financial aid) policy makers at institutional, state, and federal levels are all expected to be informed by the research findings. The research papers, as products of this dissertation, will be refined according to feedback from dissertation advisors, peer reviewers and conference presentation attendees and will be submitted to peer-reviewed journals such as *Research in Higher Education*, *Journal of Higher Education*, and *Journal of Student Financial Aid.*

Provide a reference list of sources cited:

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IRB Statement

Statement of Institutional Review Board approval or exemption:

The proposed research using de-identified BPS: 04/09 data has already received IRB exemption from Indiana University. As a research associate, I have been given access to the restricted data by NCES as well as the IRB office at Indiana University. Upon learning about this grant decision, I will consult with the IRB office to learn if I need to take further steps regarding IRB approval.

Statement of Use of Restricted Datasets

The proposed research will be using BPS: 04/09 sponsored by NCES. As stated above, we have already received the data and got the approval from the IRB office. I have been granted full access to the data.

Biographical Sketch

Education

PhD student in Educational Policy Studies, Indiana University-Bloomington (Sep 2007—present);

Master student in Applied Statistics, Indiana University-Bloomington (Sep 2010-present);

Master of Science in Economics of Education and Educational Administration, Beijing Normal University (July 2007);

Bachelor of Business Administration, Beijing Normal University (July 2004)

Research Interest

Economics of education, education finance, policy analysis and program evaluation, access to and success in higher education.

Longitudinal analysis and causal inference in educational research.

Research Experience (Selected)

Research Analyst (July 2010-present), *National Student Clearinghouse Signature Reports*, sponsored by the National Student Clearinghouse. PIs: Drs. Don Hossler, Doug Sharpiro, and Mary Ziskin. Conduct data management and analysis on national student unit-record data.

Research Associate (Mar 2008-present). *Bridges, Maps, and Fare: How Underrepresented Students Use Educational Equity Programs to Access Routes to Engagement and Academic Success,* sponsored by the Spencer Foundation. PIs: Drs. Don Hossler, George Kuh, and Rob Toutkoushian. Conduct data management and analysis on a multi-source multilevel data set (e.g. state-wide student unit record from Indiana Commission of Higher Education (ICHE), college admission data from the College Board, geo-demographic data from the Claritas Inc., post-secondary institutional data from IPEDS, and high school data from Indiana Department of Education (IDOE)).

Research Associate (Mar 2008-present). *The Mobile Working Students in Northwest Indiana: A Policy Oriented Study of Dynamics and Factors Associated with Academic Success,* Sponsored by the Lumina Foundation for Education. PI: Dr. Don Hossler. Conduct analysis on data integrated from state-wide unit records and institutional data from IPEDS.

Other Professional Experience (Selected)

Statistical Consultant (Oct 2010-present) at Indiana Statistical Consulting Center, Indiana University. Provide statistical consulting and analysis for research conducted by faculty and students at the university as well as external clients.

Teaching Assistant (Sep 2010-Dec 2010) at Statistical Department, Indiana University.

Graduate Assistant (July 2008-present) for Project on Academic Success, Center for Postsecondary Research at Indiana University. Provide research assistance, project coordinating, and office technical support.

Graduate Assistant (Sep 2007-June 2008) at Center of Evaluation and Education Policy, Indiana University. Provide research assistance to principle investigators.

Workshop Presenter (Oc1 2011). Introduction to Stata. Indiana University.

Workshop Presenter (Oct 8 2011). Data Analysis using Stata. Indiana University.

Reviewer, AERA Division J section 2 (2011).

Reviewer, AERA Longitudinal Studies Special Interest Group (LS SIG) (2011).

Reviewer, AERA Multiple Regression/ Generalized Linear Model (MLR/GLM) (2011).

Reviewer, AIR (2011).

Fellow for the 2011 National Summer Data Policy Institute at Washington, DC, sponsored by the Association for Institutional Research.

Publications and Working Papers (Selected)

Chen, J., Zerquera, D., & Torres, V. (2011). Leaving or Staying Home: Predicting the College Choice of Urban High School Graduates. Paper presented by the 51st annual forum of the Association for Institutional Research. Toronto, Canada. In preparation for journal submission.

Chen, J., & Zerquera, D. (2011). A methodological review of studies on effects of financial aid on college student success. Paper presented at the 36th annual conference of the Association for Education Finance and Policy. Seattle, Washington. In preparation for journal submission.

Dadashova, A., Hossler, D., Shaprio, D., Chen, J., et al. (2011).What happened to our students? Realities of the Great Recession. National Student Clearing House: Washington DC.

Dickinson, S., Chen, J., Hess, S., & Spradlin, T. (2011). An Evaluation of the Impact of Literacy Collaborative Intermediated Model on Student Achievement. Center for Evaluation and Education Policy: Bloomington, IN.

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Chen, J., & Zerquera, D. (2010). Academic Trajectories of transfer and first-time students: A growth curve modeling analysis. Paper presented at the 2010 Association for Study on Higher Education Annual Conference. Indianapolis, IN. In preparation for journal submission.

Toutkoushian, R. & Chen, J. (2009). The effects of No Child Left Behind on school district performance: Evidence from Indiana. Unpublished manuscript, Indiana University. Paper presented at the 33rd annual conference of the American Education Finance Association. Nashville, TN.

Cheng, G., & Chen, J. (2007). A time-series analysis and prediction of Beijing per capita GDP (in Chinese). *Productivity Research*, 3, 83-85.

Professional Skills

Good understanding of mathematical and applied statistics.

Proficient at conducting statistical analyses with STATA, SPSS, SAS, R, Mplus, and HLM.

Budget Requirements

Salary/Stipend: $13200.00
Tuition and fees: $1914.00
Travel: $700.00
Other travel related expenses: $1300.00
Other research expenses: $686.00
Total Request: $17800.00

Funding History

The applicant is no longer granted the assistantship from the school, thus the monthly salary is budgeted at a level that would preclude the applicant from seeking a full-time or hourly job during the project year.

I received the fellowship for the 2011 National Summer Data Policy Institute at Washington, DC, sponsored by the Association for Institutional Research.

Prior to this submission, this research proposal was submitted to the AERA dissertation grant program in December 2011 with pending decisions.

Letter of Support from Dissertation Faculty Advisor
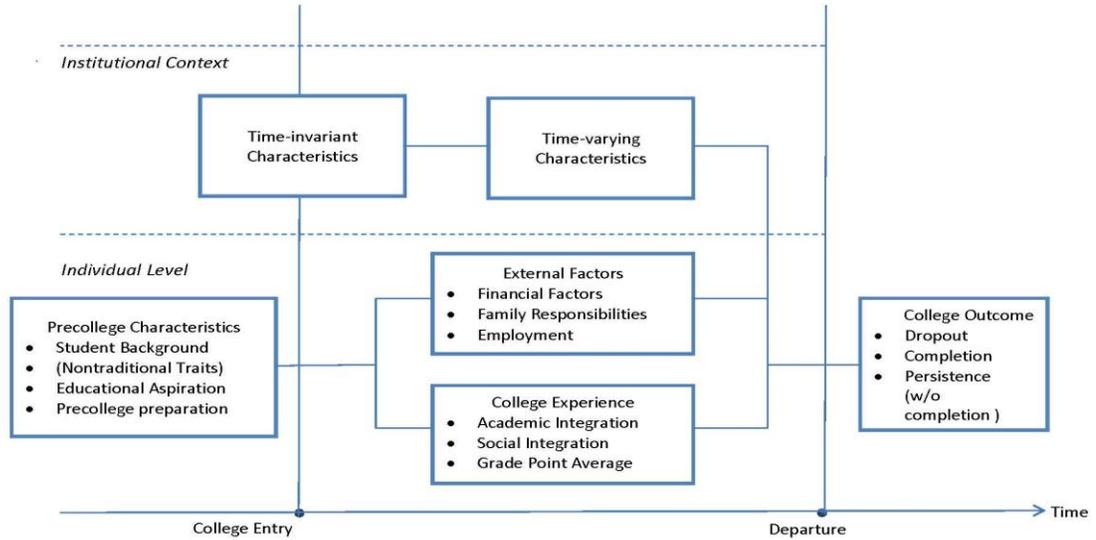
- Letter of Support

APPENDIX A
FIGURES

Figure 1 Conceptual Framework of Nontraditional Student College Success
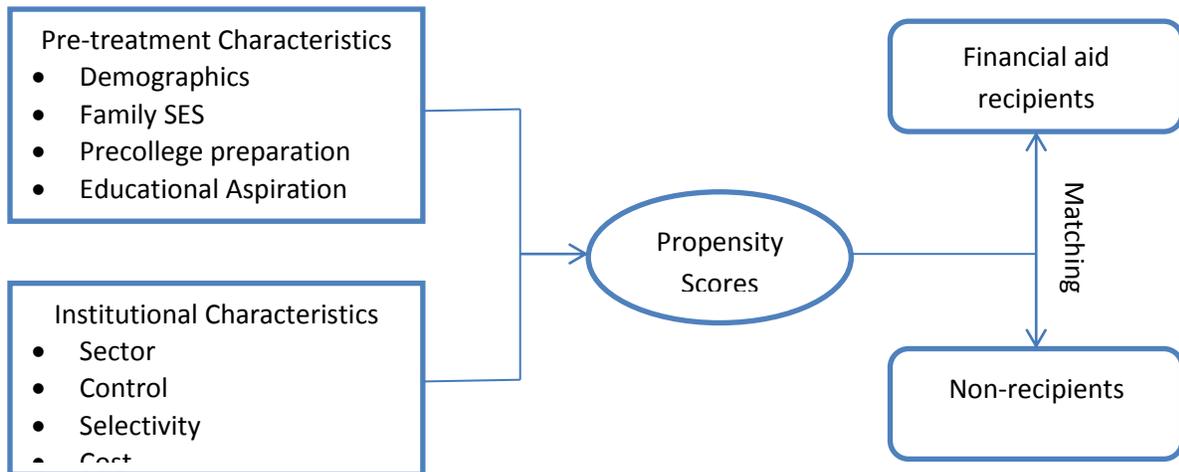

Figure 2 Diagram for Propensity Score Matching

Equation (1)

$$\text{logit}(p_i) = \log_e \left(\frac{p_i}{1-p_i}\right) = x_i\beta \quad , \qquad\qquad i = 1, 2, \ldots, N \qquad\qquad (1)$$

Where p_i denotes the probability or receiving need-based financial aid ($W_i = 1$) for person i, x_i denote a vector of pre-treatment covariates including demographic, socioeconomic, precollege and entering institutional characteristics known to be associated with financial aid receipt, and β stands for a vector of parameters.

Equation (2)

$$\text{logit } p_{i,j}(X) = \ln\frac{P_i(W_i=j|X)}{P_i(W_i=0|X)} = x_i\beta_j \qquad \text{for } j = 1,2,3 \text{ and } i = 1, 2, \ldots, N \qquad (2)$$

Where $p_{i,j}$ denotes probability of receiving financial aid type j ($W_i = j$) for student i, as opposed to receiving no financial aid ($W_i = 0$). The coefficients β_j measures the change in covariates associated with receipt of financial aid type j ($W_i = j$) relative to the controlled condition-- receipt of no aid ($W_i = 0$).

Equation (3)

$$C(p_i) = \min_j ||p_i - p_j||, \qquad \text{if } ||p_i - p_j|| < \varepsilon \quad \text{for } i \in I_1 \text{ and } j \in I_0 \qquad\qquad (3)$$

Where I_1 denotes the treated group, I_0 denotes the control group; $C(p_i)$ denotes the neighborhood of p_i, the predicted probability of receiving financial aid; $||p_i - p_j||$ is the absolute distance between the propensity score of the treated subject i and the untreated subject j; ε is a pre-specified caliper, e.g. $\varepsilon \le 0.25 \sigma_p$).

Equation (4)

$$\text{Logit}(p_i) = \log\left[\frac{P_i}{1-p_i}\right] = \beta_0 + F_i + x_i\beta \qquad\qquad i = 1,2,\ldots,N \qquad (4)$$

Where p_i denotes probability of first-year persistence for student i, F_i denotes the amount of the treatment type of financial aid, X_i denotes a vector of covariates measuring the first-year experience.

Equation (5)

$$\text{logit}[h_{i,j}(t)] = \log\left[\frac{h_{i,j}(t)}{h_{i,0}(t)}\right] = \alpha_j(t) + X_i(t)\beta_j + F_{ik}(t)\pi_j + \mu_{i,j} \quad , \quad \text{for } i = 1,\ldots N \quad \text{and } j = 1, 2 \quad (5)$$

Where $h_{i,j}(t)$ is the hazard or probability of individual i experiencing the event j at time t; $h_{i,0}(t)$ denotes the probability of individual i experiencing no event (or still enrolled); $\alpha_j(t)$ denotes the baseline hazard of experiencing event j as a function of time;

$(\mu_{i,1}, \mu_{i,2}) \sim \text{BVN}(\mathbf{0}, \mathbf{\Sigma}_{\mu})$ indicates the individual specific unobserved heterogeneity associated with person i experiencing event j; $X_i(t)$ denote a vector of both time-varying and time-invariant covariates for person i at time t.

Equation (6)

$$\text{logit}[h_{ik,j}(t)] = \log\left[\frac{h_{ik,j}(t)}{h_{ik,0}(t)}\right] = \alpha_j(t) + X_{ik}(t)\boldsymbol{\beta}_j + F_{ik}(t)\boldsymbol{\pi}_j + Z_k(t)\boldsymbol{\gamma}_j + \zeta_{k,j} + \mu_{ik,j} \quad (6)$$

Where $h_{ik,j}(t)$ denotes the hazard or probability of individual i from institution k experiencing event j at time t; $h_{ik,0}(t)$ is the probability of individual i from institution k experiencing no event (i.e. still enrolled); Z_k (t) denotes a vector of institutional level covariates for institution k at time t; $\boldsymbol{\gamma}_j$ stands for a vector of the institutional level coefficients associated with outcome j; $\zeta_{k,j}$ is the unobserved institution-specific error term.