

2008 AIR RESEARCH GRANT PROPOSAL

**A Nonparametric Examination of the Prices Low-Income Students Face
and the Payment Strategies They Utilize.**

Data set of interest:
National Postsecondary Student Aid Study:
1986/87, 1989/90, 1992/93, 1995/96, 1999/00, and 2003/04

Grant Amount Requested: \$39,960

John J. Cheslock
Assistant Professor
University of Arizona
327A Education Building
Tucson, AZ 85721
Phone: 520-621-3083 Fax: 520-621-1875
E-mail: cheslock@u.arizona.edu

Leslie P. Tolbert
Vice President for Research, Graduate Studies, and Economic Development
University of Arizona
601 Administration Building
Tucson, AZ 85721
Phone: 520-621-3513 Fax: 520-621-7507
E-mail: tolbert@email.arizona.edu

Principal Investigator

Authorized Institutional Representative

PROJECT SUMMARY

One of the most underserved groups of students within the system of higher education is low-income students. Recent evidence suggests that students from the highest family income quartile are nearly two and one-half times more likely than students in the lowest income quartile to attend a four-year institution within 20 months of high-school graduation (Ellwood & Kane, 1998). Furthermore, this gap has been growing over time. Because low-income students are the most sensitive to changes in tuition and financial aid, any comprehensive effort to substantially improve their enrollment levels must consider all possible financial barriers they might face (Heller, 1997). The first step is to examine the extent to which any financial barriers exist and the degree to which the presence and severity of them has changed over time.

Although a large literature exists on how various elements of the tuition and financial aid system have changed over recent years, very few studies have examined exactly how much higher education prices have changed for students with specific parental income levels. And those studies that do exist only compare mean levels for particular prices across broad ranges of parental income. Such an approach raises several concerns. The observed differences by parental income may be fundamentally altered if different categories of parental income were compared instead. Furthermore, any interesting differences that exist across the income values within each category cannot be observed.

Nonparametric regression techniques represent the most efficient and effective way to examine how prices and unmet need are related to a student's parental income. By abandoning the use of functional form, nonparametric regressions allow the data to characterize their own shape. Even if changes in the relationship between parental income and higher education prices are complex and highly non-linear, the flexibility of a nonparametric regression ensures that all elements of this complexity will be present in the findings. This study will be the first to utilize this valuable technique to examine the relationship between college prices and the parental income of students.

This study will also be the first to use all six years of the National Postsecondary Student Aid Study (NPSAS) survey to examine changes between 1986/87 and 2003/04. Consequently, it will provide estimates for a 17-year period and identify those years within the period that saw the most drastic levels of change. While future research will examine part-time, part-year, and independent students, this project

solely focuses on dependent undergraduate students who attend college full-time for the entire academic year. For the NPSAS surveys, 12,243 to 23,611 students are in this category per year.

This project, which consists of four main components, is also noteworthy in terms of its comprehensiveness. The first part investigates how net price has changed over the 17-year period of study and analyzes the roles played by changes in tuition, federal grants, state grants, and institutional grants. Then, a detailed examination of unmet need is conducted to demonstrate the impact that price changes had on college affordability. The third component examines the extent to which students relied upon loans and work study to pay for their education. For loans, subsidized Stafford loans, unsubsidized Stafford loans, Perkins loans, PLUS loans, and non-federal loans will all be analyzed separately. Finally, the analysis of net price, unmet need, and loan and work study reliance will be conducted separately by institutional type and selectivity to see if the trends differed by the institution the student attended.

A number of different audiences will benefit from the findings of this study. Governmental and institutional policymakers will gain a better understanding of those students for whom the current tuition and financial aid system is producing the most unmet need. They will also learn which students have been affected most by recent changes in the financial aid system. The findings from this project will also benefit institutional researchers, who will be able to compare data from their own institution to the national trends observed in this study. Finally, all researchers will benefit from the insights produced by this study on how to make the six years of NPSAS data comparable and easy to use.

This project is well suited for the AIR Research Grants program. By studying the financial access of low-income students, one of the groups of students most underserved by the higher education system, it closely aligns to NPEC's focus this year. The AIR grant program also seeks to foster the use of IES-NCES data, and this project will seek to do exactly that for all six NPSAS surveys. Previous research has drastically underutilized these surveys by rarely using multiple years in combination, and this research project will help address this problem by demonstrating the successful use of multiple NPSAS years and by sharing the code needed to prepare and standardize variables from all six surveys. Finally, by involving a research assistant who is an aspiring institutional researcher, this project will also address another goal of the AIR program: to provide professional development opportunities for institutional researchers.

TABLE OF CONTENTS

Cover Sheet	1
Project Summary	2
Table of Contents	4
Project Description	
Statement of Problem	5
Literature Review	6
Research Questions	8
Proposal of Work	
Data Sources	8
Sample Size	9
Variables	9
Empirical Methodology	13
Innovative Aspects	15
Impact of Work	
Impact on Multiple Audiences: Governmental Policymakers, Institutional Policymakers, and Institutional Researchers	15
Impact on Use of NPSAS Data by Other Researchers	16
Impact on Future Tuition and Financial Aid Research by Principal Investigator	16
Impact on Research Assistant's Career Development as an Institutional Researcher	17
Dissemination Plan	17
References	19
Biographical Sketch	21
Budget	24
Current and Pending Support	26
Facilities, Equipment, and Other Resources	26
Special Information and Supplementary Documentation	26

PROJECT DESCRIPTION

Statement of Problem

The likelihood that a student participates in higher education is highly influenced by the income of the student's parents. Using data from the National Education Longitudinal Study for the high-school class of 1992, Ellwood and Kane (1998) found that 66% of students from the highest family income quartile attended a four-year institution within 20 months of high-school graduation, while only 28% of students from the lowest family income quartile did. Furthermore, Ellwood and Kane (1998) found that these gaps had increased over time; the corresponding figures were 55% and 29% for the high-school classes of 1980 and 1982.

There are several potential explanations for these differences. Low-income students may attend K-12 schools with fewer resources and may consequently have worse academic preparation. These students may also be less likely to have parents who attended college and may receive less encouragement to further their education after high school. While such considerations may explain a substantial part of the gap in enrollment, financial considerations also likely play an important role. Previous research has demonstrated that the enrollment decisions of low-income students are the most sensitive to changes in the price of college (Heller, 1997).

A number of factors are altering the prices that most students face when considering higher education. Over the last 25 years, listed tuition and fees has increased by 140% at four-year private institutions, 192% at four-year public institutions, and 134% at two-year public institutions, as many colleges and universities have turned to tuition revenue to cover their rising expenses (Baum & Ma, 2007). The increased need for tuition dollars may be especially severe at public higher education institutions, as state appropriations have not increased with educational costs (Cheslock & Gianneschi, in press).

Financial aid has increased over time, so part of that increase in listed tuition was offset by aid. But several elements of the financial aid system have limited the amount of this aid that went to low-income students. The maximum award for the Pell grant, the primary federal source of need-based financial aid, has only increased by 12 percent over the last 25 years (Baum & Steele, 2007). Much of the increase in state financial aid was driven by the introduction of merit-aid programs in many states, whose dollars disproportionately go to upper-income students (Heller, 2002). Financial aid provided by

institutions of higher education also increased, but competition across schools for students has caused a substantial share of these aid dollars to go to middle- and upper-income students (McPherson & Shapiro, 1998).

Although previous research has examined the trends in these various sources of financial aid, very little research has thoroughly examined changes in the net price for low-income students or investigated how the various elements of the tuition and financial aid system contributed to these changes. Furthermore, previous research has not sufficiently examined the extent to which these variations in price affected the level of unmet need for low-income students. Nor has it precisely measured the extent to which students of different income levels rely upon loans and work study to pay for their education.

This study will seek to further our knowledge in these areas by using all six National Postsecondary Student Aid Study (NPSAS) surveys in combination with nonparametric regression techniques. While the motivation for this project concentrates on low-income students, estimates will be produced for all parts of the income distribution. This will strengthen the analysis for low-income students, because the findings for these students can be compared to the findings for middle- and upper-income students. But it will also benefit any policymakers or researchers who are interested in similar questions for middle- and upper-income students.

Literature Review

An extremely large literature examines how the enrollment decisions of students are affected by changes in tuition levels and financial aid. (See Heller (1997) and Leslie and Brinkman (1987) for thorough summaries of this literature.) The literature clearly demonstrates that students respond to changes in tuition and financial aid, although the extent of their response depends upon their income level and the characteristics of the aid program (Avery & Kane, 2004; Dynarski, 2003; Heller, 1997). The numerous types of aid programs that exist result in an extremely complex system, and a number of authors have analyzed the system and called for reform (Archibald, 2002; Kane, 1999).

Other research examines the factors and policies that influence the prices that students face. Much of that literature focuses on pressures that have caused higher education institutions to seek to increase net tuition revenue (Cheslock & Gianneschi, in press; Ehrenberg, 2000). Another strand in the literature

focuses on the strategic choice between high-tuition/high-aid policies and low-tuition/low-aid policies (Hearn & Longanecker, 1985; Mumper, 1996). But some authors disagree with the framing of these policy alternatives by suggesting that high-tuition/high-aid policies are unsuccessfully implemented, because funding for financial aid rarely rises with tuition (Griswold & Marine, 1996; Mumper, 2003).

In its entirety, past research clearly suggests that prices for students are rising. Because the research literature indicates that low-income students' enrollment decisions are especially sensitive to price increases, much of the financial aid policy debate has focused on the extent to which prices have risen for these students in particular. But the research literature has produced a relatively small number of studies that thoroughly examine exactly how much higher education prices have changed over recent years for students with specific parental income levels.

The most comprehensive examination of higher education prices to date was performed by Wei, Li, and Beker (2004). The authors used the 1989/90, 1992/93, 1995/96, and 1999/00 NPSAS surveys to examine how tuition, grants, loans, net prices, and unmet need changed over their 10 year period. The authors provide sound and detailed estimates of how various elements of the financial aid system changed for students as a whole, but their analysis of differences by parental income yields fewer insights. The authors present mean figures for each parental income quartile, which produces two concerns. First, the distribution of income fundamentally changed between 1989/90 and 1999/00, so students in the lowest income quartile in 1989/90 may have very different income levels than students in the lowest income quartile in 1999/00. Second, by only examining broad groups of parental income values, the authors' findings could be misleading or overly aggregated. The observed differences by parental income may be fundamentally altered if different categories of parental income (such as quintiles or deciles) are used instead. Furthermore, any interesting differences that exist across the income values within each category cannot be observed.

Some studies examine how tuition and/or financial aid have changed over time and do not use income quartiles; instead, they examine how prices changed for low income, middle income, and upper income students and base their assignment to these groups on income ranges that are consistent over time (Heller, 1999; McPherson & Shapiro, 1999). But these studies are not comprehensive in that they only

present evidence for a few variables, and they are similar to Wei, Li, and Beker (2004) in that they only study broad ranges of parental income.

To conclude, only a small body of research has used multiple years of NPSAS data to examine how the price of higher education has changed for students with particular values of parental income. Furthermore, the few studies that exist suffer from methodological concerns that limit the insights that can be drawn from their findings. This proposed study will seek to fill this hole in the literature and provide a comprehensive and methodologically sound analysis of the prices facing students of different income levels and the payment strategies these students utilize.

Research Questions

This project will address four sets of research questions:

1. How did changes in the net price of higher education vary across different levels of parental income? How did fluctuations in tuition, federal grants, state grants, institutional grants, and other grants contribute to these changes in net price?
2. How did changes in net price alter the level of unmet need for students with different levels of parental income? How did fluctuations in total educational cost, expected family contribution, and total grants contribute to these changes in unmet need?
3. Did students' reliance upon loans and work study to pay for their education vary over time? How did these changes over time differ by parental income? How much unmet need remained for low income students after loans and work study were included?
4. Did changes in net price, unmet need, and reliance upon loans and work study vary by the type and selectivity of the institution attended?

Proposal of Work

Data Sources

This project will be the first to use all six years of the National Postsecondary Student Aid Study (NPSAS) surveys. These surveys cover the academic years 1986-87, 1989-90, 1992-93, 1995-96, 1999-00, and 2003-04. To include information about the selectivity of each student's institution, the researchers will

merge in additional data from *Barron's Profiles of American Colleges*. (Because the restricted NPSAS data sets contain the IPEDS unitid of the institution that each student attends, *Barron's* data can easily be merged with NPSAS data.)

Sample Size

In this study, the researchers will only examine full-time/full-year dependent undergraduates who only attend one institution during the year of observation. (As noted later in this proposal, similar questions for part-time, part-year, and independent students will be examined in future research.) The NPSAS surveys contain data for a large number of students, so a sufficient sample remains after these restrictions are added. For each NPSAS year, Table 1 demonstrates the number of full-time/full-year dependent undergraduates who attend one institution. Of course, the final sample size can be reduced by missing data, and that possibility will be discussed in the next section.

Table 1: Sample Size

Year	# Observations
1986-87	19,825
1989-90	12,243
1992-93	15,085
1995-96	15,524
1999-00	14,449
2003-04	23,611

Variables

This section discusses the variables that will be examined in this project. A preliminary examination of the NPSAS Electronic Codebook for each year was conducted to identify potential variables to be included; that information is listed in a number of the below tables. But given the scale of the endeavor, the list of variables to be used may be further refined through additional investigation and communication with NPSAS staff.

For all of the analyses, variables measuring each student's parental income are required. Preliminary investigation of NPSAS data indicates that sound and comparable estimates of parental income

are available for each NPSAS survey. In the 1986/87 version of NPSAS, the variable dep_inc will be used and for the later five NPSAS surveys, the variable depinc will be used.

An examination of the first research question also requires information on the tuition level, federal grants, state grants, institutional grants, and other grants for each student. Table 2 contains a preliminary list of names for each of the variables in the restricted versions of all six NPSAS surveys.

Table 2: Variables for Research Question #1

Year	Tuition & Fees	Grants			
		Federal	State	Institution	Total
1986-87	tuitfee	fgrt_amt	sgrt_amt	igrt_amt	grt_amt
1989-90	tuitcost	tfedgrt	stateamt*	innondgr+inneedgr*	totgrt
1992-93	tuitcost	tfedgrt	stgrtamt	ingrtamt	totgrt
1995-96	tuition2	tfedgrt	stgtamt	ingrtamt	totgrt
1999-00	tuition2	tfedgrt	stgtamt	ingrtamt	totgrt
2003-04	tuition2	tfedgrt	stgtamt	ingrtamt	totgrt

* Our preliminary investigation did not produce a direct measure of the desired variable, so until a direct measure can be located, we simply list variables here from which we should be able to deduce the desired measure.

Optimally, one could also include data on a student's education tax benefit when computing net price, but NPSAS data does not contain detailed information on the amount of tax benefits each student received. But recent NPSAS surveys do contain information on whether students or families claimed the federal HOPE scholarship tax credit, the tax deduction for tuition, or the lifetime learning tax credit. Using these variables and assumptions about the size of the tax benefit, the researchers will also produce estimates of net price that include tax benefits as a type of financial aid.

Information on the total educational cost, expected family contribution (EFC), total grant aid, and unmet need for each student is needed to answer the second research question. Table 3 contains a preliminary list of names for the required variables in the restricted versions of all six NPSAS surveys. (Unmet need can be calculated from the three variables listed in Table 3.) Throughout the project, great effort will be exerted to ensure that variables are measured in a similar fashion across years. The formula used to measure a student's expected family contribution (EFC) is of special concern, because it underwent

substantial revisions during the 1992 reauthorization of the Higher Education Act. For the EFC and all variables, the researchers will seek to identify any changes in measurement that prevent simple comparisons over time and will try to develop adjustment procedures that allow comparisons to still be made.

Table 3: Variables for Research Question #2

Year	Educational Costs	EFC	Grants
1986-87	std_cost	dep_efc	gran_amt
1989-90	totcost	efc3	totgrt
1992-93	budgetaj	efc4	totgrt
1995-96	budgeta2	efc4	totgrt
1999-00	budgeta2	efc4	totgrt
2003-04	budgetaj	efc	totgrt

To address the third research question, detailed information on each student’s reliance upon loans and work study is required. Table 4 contains a preliminary list of names for loan and work study variables in the restricted versions of all six NPSAS surveys. To provide detailed information on loan reliance, information on borrowing for a number of different aid programs is also desired. Loan types of interest include the subsidized Stafford loan, the unsubsidized Stafford loan, Perkins loan, PLUS loans, and non-federal loans. Table 5 contains a preliminary list of these loan types in the restricted versions of all six NPSAS surveys. Optimally, the project will also include an analysis of private loans, because these loans have received substantial attention in recent years. While the NPSAS data set only contains measures of private loans for the most recent years, the researchers hope to devise a way to measure private loan volume using the non-federal measure and variables for other non-federal loan types (such as state and institutional loans).

Table 4: Variables for Research Question #3: Total Work Study and Loans

	Work Study	Total Loans	
		Without PLUS	With PLUS
1986-87	work_amt	loan_amt – plusamt	loan_amt
1989-90	Totwkst	totloan – plusamt	totloan
1992-93	Totwkst	totloan	totloan2
1995-96	Totwkst	totloan	totloan2
1999-00	Totwkst	totloan	totloan2
2003-04	Totwkst	totloan	totloan2

Table 5: Variables for Research Question #3: Loan Type

	Stafford		Perkins	PLUS	Non-Federal
	Subsidized	Unsubsidized			
1986-87	staffamt	n/a	perkamt	plusamt	oloanamt
1989-90	stafford	n/a	perkamt	plusamt	tnfedln
1992-93	staffamt	n/a	perkamt	plusamt	tnfedln
1995-96	staffsub	staffunsb	perkamt	plusamt	tnfedln
1999-00	stafsub	stafunsb	perkamt	plusamt	tnfedln
2003-04	staff	staffunsb	perkamt	plusamt	tfedln

In the final part of the project (research question #4), the researchers will examine how the answers to the first two research questions vary by the type of institution attended. A number of institutional types will be studied: two-year public institutions, four-year public institutions, four-year private institutions, and for-profit institutions. Table 6 contains the sample sizes for each category for each of the NPSAS years. Given the small sample sizes for two-year public institutions and for-profit institutions in particular years, analyses for those years may be limited. (The sample sizes for two-year private institutions are so small that this category is not included in Table 6.) When examining differences by the selectivity of the institution, the researchers will use the six category ranking included in *Barron's*

Profiles of American Colleges. (A few of the categories are likely to be combined due to sample size concerns.)

Table 6: Sample Size by Institutional Type

Year	# Observations			
	Two-Year Public	Four-Year Public	Four-Year Private	For-Profit
1986-87	1,095	7,857	8,742	1,140
1989-90	508	4,422	6,389	544
1992-93	692	8,594	5,013	634
1995-96	834	7,783	5,897	625
1999-00	1,029	7,613	4,913	527
2003-04	4,205	10,349	6,908	1,683

To identify any problems that may drastically reduce our sample size, a preliminary investigation of the level of missing data for the variables described above was conducted. In only two cases was the level of missing data substantial. Expected family contribution (EFC) was missing data (close to 20 percent of observations) in some years, and variables representing some of the specific loan types were missing data for a large number of observations for the 1986/87 survey. This project will still be successful if this level of missing data persists for these variables as they represent only a small part of the analysis. Moreover, a more thorough examination of the data (beyond the preliminary work conducted to date) may locate alternative measures that contain lower levels of missing data.

Empirical Methodology

This project seeks to examine how the variables described in Tables 2-5 vary with the parental income of a student. As discussed in the literature review section earlier in this document, previous research has simply examined the mean level of selected variables for various groupings of parental income values. The results of such analysis, however, are heavily dependent upon the groupings used for parental income, and it is often difficult to know whether the results would change if alternative groupings were utilized. Furthermore, one does not know whether the results vary for different levels of income within each grouping.

An alternative approach is to use regression analysis, where parental income is the independent variable and the other variables alternate as the dependent variable. One cannot use a basic linear regression, however, because the effect of income on variables such as net price or unmet need is likely to be highly non-linear. As opposed to trying to capture the type of non-linearity through the use of alternative functional forms, the optimal approach would be to abandon the use of functional forms altogether through the use of nonparametric regression techniques. Nonparametric regressions allow the data to characterize their own shape.

Substantial developments in available software and computing power have made nonparametric regression accessible to a wide range of researchers (DiNardo & Tobias, 2001). The most common nonparametric approach, which we will use, is local linear regression, which estimates separate kernel regressions for a number of different values of parental income. Kernel regressions are essentially weighted least squares regressions, where the data points farther away from the particular value of parental income receive less weight than closer data points.

For each dependent variable, regressions will be estimated separately for each NPSAS year and the results across years will be examined to detect structural change. To examine differences by institutional type, separate regressions for each type will be estimated. All of the institutional variables described in the previous section are categorical and well suited to this approach.

One drawback to the nonparametric approach is that no simple procedure exists for the calculation of reliable standard errors. For tests of statistical significance, the available methods for the calculation of nonparametric standard errors will be used when such methods are successful with the relevant sample. (See *Hardle (1990)* and *Fan and Gijbels (1996)* for a discussion of these techniques.) If not successful, the researchers will use parametric analysis when statistical tests are required and will use non-parametric techniques to ensure that appropriate parameters are utilized.

It is important to note that only the basic relationship between parental income and the other variables of interest needs to be estimated in order to address the research questions contained in this project. In other words, controls for additional variables do not need to be included in the regression analysis. This work, however, could easily be expanded to include a set of control variables through the use of partially linear or semilinear regression models. (See pages 24-26 of *DiNardo and Tobias (2001)* for

a discussion of these techniques.) One future extension to this project will be to add controls for a number of institutional characteristics, so that one can understand how financial aid and unmet need vary by parental income when the effect of differences in college choice by parental income is removed.

Innovative Aspects

There are two major innovative aspects to this study. The first innovation regards the data utilized, as this study is the first to use all six years of NPSAS data. It will examine how variables such as net price and unmet need varied over a 17-year period for particular levels of parental income. Previous work has only examined shorter periods, and only one study used more than two years of NPSAS data simultaneously. By using all six years of NPSAS data, this project will provide estimates for a long period of time and identify those years within the period that contained the most drastic levels of change.

The second innovation is methodological. Previous work in this line of research has simply compared means across years for different income quartiles or broad income groups. As discussed in the literature review section, this approach can potentially lead to incorrect and overly aggregated estimates. This study will use nonparametric regression, the most efficient and effective way to examine how prices and unmet need are related to a student's parental income.

Impact of Work

The work contained in this project will have four major impacts. It will provide helpful information to governmental policymakers, institutional policymakers, and institutional researchers, increase researchers' knowledge and use of NPSAS data, suggest additional research on tuition and financial aid, and provide extensive experience for a graduate student who aspires to become an institutional researcher. This section discusses each of these impacts in more detail.

Impact on Multiple Audiences: Governmental Policymakers, Institutional Policymakers, and Institutional Researchers

Low-income students are trailing far behind their peers in terms of educational attainment, and some evidence suggests that this gap is growing (Ellwood & Kane, 1998). Because research indicates that

increases in the price of education affects enrollment most for low-income students (Heller, 1997), improvements in tuition and financial aid policy could potentially have a major impact on low-income students' educational attainment. This study highlights those students for whom the current tuition and financial aid system is leaving with the most unmet need. It also identifies the consequences of this unmet need by detailing the extent to which low-income students rely upon loans to cover the price of their education. This information can aid governmental and institutional policymakers seeking to adjust their policies to better serve those students who fare worst in the current system. The results from this research can also help policymakers understand how past policy changes have impacted the financial situations of students, because data will be provided for six years between the 1986/87 and 2003/04 period. Institutional researchers can compare data from their own institution to the national trends observed during this period.

Impact on Use of NPSAS data by Other Researchers

Through the course of this project, all efforts will be undertaken to make the six years of NPSAS as comparable as possible. The researchers will identify variables across years that measure the same concept, identify differences in measurement that may hinder comparability, and develop adjustment procedures when possible to continue to allow for comparability. The findings of this project and the code used to prepare the NPSAS data will be widely shared and should increase the quality and amount of future research that uses NPSAS data. To date, very few researchers have utilized multiple years of NPSAS data simultaneously.

Impact on Future Tuition and Financial Aid Research by Principal Investigator

The scope of the research described in this proposal reflects the time limitations contained in the grant. Over the next 5-10 years, the principal investigator is planning to engage in a much more expansive analysis of NPSAS data and key questions regarding tuition and financial aid. The most obvious extension of this project is to replicate it using independent, part-time, and part-year students, a group of students that are rarely studied in past work because they introduce a number of complications into the research design.

These students, however, represent a majority of students enrolled in higher education, and they also represent a majority of the students surveyed in NPSAS.

The principal investigator is also planning a number of studies that examine how particular policies and factors affect tuition and financial aid. For example, how does variation in state appropriations, private donations, state merit aid programs, and competition across schools impact the net price and unmet need of various students? (Each of these elements would likely require its own study.) This line of research may be especially promising if the repeated sampling of the same institutions across NPSAS surveys can be effectively exploited using regressions that incorporate institutional fixed-effects. Preliminary analysis of the last five NPSAS surveys demonstrates that 20 percent of the institutions sampled have students in two NPSAS surveys and an additional 20 percent have students in three or more NPSAS surveys.

All of these future research projects, however, require a firm understanding of the comparability of the variables from the six NPSAS surveys. Consequently, the research contained in this proposal will not only advance the line of research to be conducted for this grant but it will also advance a number of other lines of research.

Impact on Research Assistant's Career Development as an Institutional Researcher

Matt Foraker, a graduate student and an aspiring institutional researcher, will play a major part in this project. He will perform much of the data preparation and data analysis and part of the literature review. He will also be involved in other parts of the project so that he can gain a full understanding of the research process. Matt is completing his coursework and will soon be developing his dissertation plans, so his involvement in the project will greatly enhance his research ability at an opportune time. This grant will also provide Matt the opportunity to attend the 2009 Association for Institutional Research conference, which will help his professional development as an institutional researcher.

Dissemination Plan

The results of this project will be disseminated in three ways. The principal investigator will e-mail drafts of the paper to others who work in this area of research and put a copy of the paper on his

personal website (to be created in the summer of 2008) to allow for download by interested parties. The researchers will also present the results at the 2009 Association for Institutional Research conference. A final version of the study will be submitted to respected academic journals in education or public policy. Leading journal candidates include *Research in Higher Education* and *Educational Evaluation and Policy Analysis*. Less technical versions of the paper will also be submitted to outlets such as *Change*, which are read by a broad audience of policymakers in higher education.

REFERENCES

- Avery, C. and Kane, T. (2004). Student perceptions of college opportunities: The Boston COACH program. In C. Hoxby (Ed.) *College choices: The economics of where to go, when to go, and how to pay for it* (pp. 355-391). Chicago: University of Chicago Press.
- Archibald, R. (2002). *Redesigning the financial aid system: Why colleges and universities should switch roles with the federal government*. Baltimore: The Johns Hopkins University Press.
- Baum, S. & Ma, J. (2007). *Trends in college pricing, 2007*. College Board: Washington, DC.
- Baum, S. & Steele, P. (2007). *Trends in student aid, 2007*. College Board: Washington, DC.
- Cheslock, J. & Gianneschi, M. (in press). Replacing state appropriations with alternative revenue sources: The case of voluntary support. *Journal of Higher Education*.
- DiNardo, J. & Tobias, J. (2001). Nonparametric density and regression estimation. *Journal of Economic Perspectives*, 15(4), 11-28.
- Dynarski, S. (2003). Hope for whom? Financial aid for the middle class and its impact on college attendance. *National Tax Journal*, 53(3), 629-661.
- Ehrenberg, R. (2000). *Tuition Rising: Why Colleges Costs so Much*. Cambridge, MA: Harvard University Press.
- Elwood, D. & Kane, T. (1998). Who is getting a college education: Family background and the growing gaps in enrollment. In S. Danzinger & J. Walkfegel (Eds.) *Securing the Future* (pp. 283-324). New York: Russell Sage Foundation.
- Fan, J. & Gijbels, I. (1996). *Local polynomial modeling and its applications*. London: Chapman and Hall.
- Griswold, C. & Marine, G. (1996). Political influences on state policy: Higher-tuition, higher-aid, and the real world. *Review of Higher Education*, 19(4), 361-389.
- Hardle, W. (1990). *Applied nonparametric regression*. Cambridge, MA: Cambridge University Press.
- Hearn, J., & Longanecker, D. (1985). Enrollment Effects of Alternative Postsecondary Pricing Policies. *Journal of Higher Education*. 56(5), 485-508.
- Heller, D. (1997). Student Price Response in Higher Education: An update to Leslie and Brinkman. *Journal of Higher Education*, 68(6), 624-659.

- Heller, D. (2002) "The Policy Shift in State Financial Aid Programs" in J. Smart (Ed.) *Higher Education: Handbook of Theory and Research, Volume 17* (pp. 221-261). Vol. 17. New York: Agathon Press.
- Heller, D. & Laird, T. (1999). Institutional need-based and non-need grants: Trends and differences among college and university sectors. *Journal of Student Financial Aid*, 29(3), 7-24.
- Leslie, L. & Brinkman, P. (1987). Student price response in higher education. *Journal of Higher Education*, 58, 181-204.
- Kane, T., (1999). *The price of admission: Rethinking how Americans pay for college*. Brookings Institution Press: Washington, DC.
- McPherson, M. and Shapiro, M. (1998). *The student aid game: Meeting need and rewarding talent in American higher education*. Princeton, NJ: Princeton University Press.
- McPherson, M. & Shapiro, M. (1999). *Reinforcing stratification in American higher education: Some disturbing trends*. National Center for Postsecondary Improvement Technical Report Number 3-02.
- Mumper, M. (1996). *Removing College Price Barriers*. Albany, NY: State University of New York Press.
- Mumper, M. (2003). Does policy design matter? Comparing universal and targeted approaches to encouraging college participation, *Educational Policy*, 17(1), 38-59.
- Wei, C., Li, X., & Beker, L. (2004). *A Decade of Undergraduate Student Aid: 1989-90 to 1999-00*. U.S. Department of Education, Institute of Education Sciences: Washington, DC.

BIOGRAPHICAL SKETCH

Autobiographical Statement

John Cheslock is an Assistant Professor in the Center for the Study of Higher Education at the University of Arizona. Dr. Cheslock joined the Center after obtaining his Ph.D. in Labor Economics from Cornell University in 2001. While at Cornell, he also served as a research assistant to Ronald Ehrenberg in the Cornell Higher Education Research Institute (CHERI). His research focuses on the economics of higher education, with a special interest in tuition and financial aid policy, faculty labor markets, the role of Title IX in intercollegiate athletics, and revenue stratification across institutions.

Dr. Cheslock has published multiple articles in both the *Journal of Higher Education* and *Review of Higher Education*, two of the leading journals devoted to the study of higher education. In addition, he has published articles in well-respected economics journals, such as the *American Economic Review* and the *Economics of Education Review*. He has also produced chapters for a number of edited volumes, including three chapters for various editions of *New Directions for Institutional Research*. He is currently on the editorial board of the *Review of Higher Education*.

In graduate school, Dr. Cheslock received extensive statistical training as he minored in applied econometrics. He teaches introductory and advanced statistical courses at the University of Arizona, and has utilized advanced econometrics in all of his past research. He has extensive experience preparing and cleaning data from multiple years of the same survey and adjusting variables when needed to ensure consistency. Furthermore, he has experience using large-scale surveys and adjusting the analysis to incorporate the relevant weights and sampling design. He has used NCES surveys (NSOPF, ELS, NELLS) in the past and is familiar with the survey and weighting commands within STATA. He already has a restricted license with NCES and all restricted NPSAS surveys are already included in that license.

Research on tuition and financial aid policy will be the primary focus of Dr. Cheslock's research agenda over the next five to ten years, and this proposed project represents the first major portion of that work. Because this project will allow Dr. Cheslock to standardize variables across all six years of the NPSAS surveys, it will help stimulate numerous research projects on tuition and aid beyond the one described in this study.

Abbreviated Curriculum Vitae

Chronology of Education

- Ph.D. in Labor Economics, Cornell University, May 2001.
Dissertation: *Essays on Enrollment Policies in Higher Education*.
Minor fields: Applied Econometrics, Education.
Advisor: Ronald G. Ehrenberg.
- M.S. in Labor Economics, Cornell University, January 1999.
Thesis: *How Teacher Unions Affect Educational Performance*.
- B.S. in Economics, Bowling Green State University, May 1995.
Summa cum laude, minor in Mathematics.

Chronology of Employment

- University of Arizona, Tucson, AZ.*
2001 – present. Assistant Professor, Center for the Study of Higher Education.
- Cornell University, Ithaca, NY.*
1998 – 2000. Research Assistant, Cornell Higher Education Research Institute.
1996 – 1998. Teaching Assistant, Department of Labor Economics.

Refereed Journal Articles

- Callie, T., & Cheslock, J. (in press). The Hiring and Compensation Practices of Business School Deans. *Review of Higher Education*.
- Dowd, A., Cheslock, J. & Melguizo, T. (in press). Transfer Access from Community Colleges and the Distribution of Elite Higher Education. *Journal of Higher Education*.
- Cheslock, J. & Gianneschi, M. (in press). Replacing State Appropriations with Alternative Revenue Sources: The Case of Voluntary Support. *Journal of Higher Education*.
- Anderson, D., Cheslock, J., & Ehrenberg, R. (2006). Gender Equity in Intercollegiate Athletics: Determinants of Title IX Compliance. *Journal of Higher Education*, 77(2), 225-250.
- Cheslock, J. (2005). Differences Between Public and Private Institutions of Higher Education in the Enrollment of Transfer Students. *Economics of Education Review*, 24(3), 263-274.
- Anderson, D. & Cheslock, J. (2004). Institutional Strategies to Achieve Gender Equity in Intercollegiate Athletics: Does Title IX Harm Male Athletes? *American Economic Review*, 94(2), 307-311.
- Ehrenberg, R., Cheslock, J., & Epifantseva, J. (2001). Paying our Presidents: What do Trustees Value? *Review of Higher Education*, 25(1), 15-38.

Chapters in Edited Volumes

- Cheslock, J. & Eckes, S. (in press). Statistical Evidence and Compliance with Title IX. In A. Luna (Ed.), *Legal Issues and Institutional Research*. New Directions for Institutional Research. San Francisco, CA: Jossey-Bass.
- Espino, M. & Cheslock, J. (2008). Considering the Federal Classification of Hispanic-Serving Institutions and Historically Black Colleges and Universities. In M. Gasman, B. Baez, & C. Turner (Eds.), *Interdisciplinary Approaches to Understanding Minority Serving Institutions*. Albany, NY: SUNY Press.

Cheslock, J. (2006). Applying Economics to Institutional Research on Higher Education Revenues. In M. Paulsen & R. Toutkoushian (Eds.), *What Institutional Research is Learning from the Field of Economics* (pp. 25-41). New Directions for Institutional Research No. 132. San Francisco, CA: Jossey-Bass.

Diaz, V. & Cheslock, J. (2005). Faculty Work and the Use of Electronic Technology. In J. Levin, S. Kater, & R. Wagoner (Eds.), *Community College Faculty: At Work in the New Economy* (pp. 63-80). New York: Palgrave.

Lee, J., Cheslock, J., Maldonado-Maldonado, A., & Rhoades, G. (2005). Professors as Knowledge Workers in the New, Global Economy. In J. Smart (Ed.), *Higher Education: Handbook of Theory and Research Volume XX* (pp. 55-132). Dordrecht, The Netherlands: Kluwer Academic Publishers.

Cheslock, J. & Anderson, D. (2005). Lessons from Research on Title IX and Intercollegiate Athletics. In R. Simon (Ed.) *Sporting Equality: Title IX Thirty Years Later* (pp. 127-146). Piscataway, NJ: Transaction Publishers.

Cheslock, J. (2003). Determining the Costs of Transfer Students at American Colleges and Universities. In F. Alexander & R. Ehrenberg (Eds.), *Maximizing Revenue in Higher Education* (pp. 55-66). New Directions for Institutional Research No. 119. San Francisco, CA: Jossey-Bass.

Monographs

Cheslock, J. (2007). *Who's Playing College Sports? Trends in Participation*. East Meadow, NY: Women's Sports Foundation.

Dowd, A. & Cheslock, J. (2006). *Community College Transfer Students at Selective Colleges and Universities in the United States: An Estimate of the Two-Year Transfer Population at Elite Institutions and of the Effects of Institutional Characteristics on Transfer Access*. Lansdowne, VA: Jack Kent Cooke Foundation.

Grants

Principal Investigator, Intercollegiate Athletics Participation Study, Women's Sports Foundation; \$65,552; August 2006 – July 2008.

Research Consultant, Economic, Informational, and Cultural Barriers to Community College Transfer Enrollment at Selective Institutions, Jack Kent Cooke Foundation, Lumina Foundation for Education, and Nellie Mae Education Foundation. Co-PIs – A. Dowd & G. Gabbard, University of Massachusetts, Boston. March 2005– February 2006.

Professional Service

Member, Editorial Board, *Review of Higher Education*: 2005-present

Reviewer: *American Educational Research Journal*, *British Journal of Industrial Relations*, *Canadian Journal of Higher Education*, *Economic Inquiry*, *Economics of Education Review*, *Higher Education*, *Journal of Higher Education*, *Journal of Human Resources*, *Quarterly Journal of Business and Economics*, *Research in Higher Education*, *Review of Economics and Statistics*, *Review of Higher Education*.

BUDGET

Budget: A Nonparametric Examination of the Prices Low-Income Students Face and the Payment Strategies They Utilize.

Personnel

Principal Investigator (John Cheslock)	
1.75 months at \$7,011 per month	\$12,269
Research Assistant (Matt Foraker)	
Academic year half-time graduate assistantship (20 hours per week)	<u>\$13,619</u>
Total Salaries and Wages	\$25,887

Fringe Benefits

Principal Investigator (John Cheslock)	
0.875 months at 27.4% (2008 Fiscal Year)	\$1,681
0.875 months at 29.5% (2009 Fiscal Year)	\$1,810
Research Assistant (Matt Foraker)	
Graduate assistantship: 38.4%	<u>\$5,230</u>
Total Fringe Benefits	\$8,720

Travel

2008 AIR Conference: Principal Investigator & Research Assistant	<u>\$3,000</u>
Total Travel	\$3,000

Other Direct Costs

Computer Software	\$1,353
General Supplies	<u>\$1,000</u>
Total Other Direct Costs	\$2,353

TOTAL AMOUNT OF AWARD **\$39,960**

Budget Justification

Salary & Wages: John J. Cheslock, Principal Investigator

I am requesting 1.75 months of summer salary for time spent coordinating the project, developing the statistical models, writing, and participating in other parts of the project as needed.

Salary & Wages: Matt Foraker, Research Assistant

I am requesting funds to hire Matt Foraker, a graduate student and aspiring institutional researcher, as a half-time graduate assistant for the 2008-09 academic year. Under the terms of the assistantship, Matt will be required to work 20 hours per week. Matt will perform much of the data preparation and data analysis for this project and part of the literature review. When it will help Matt reach his educational objectives, I will also include him in other parts of the project.

Fringe Benefits

The fringe benefits for the principal investigator are based on the University of Arizona rates of 27.4% (FY 2008) and 29.5% (FY 2009). The fringe benefits for the research assistant are based on the University of Arizona rate of 38.4%.

Travel

I am requesting funds so that my research assistant and I can present the findings of our research at the 2009 Association for Institutional Research (AIR) annual forum (Atlanta, GA).

Software

To ensure that my research assistant has the proper software and documentation, I am requesting funds to purchase STATA (\$695), STATA's base reference manuals (\$179), Stat Transfer (\$179), and End Note (\$300).

General Supplies

I am requesting funds to purchase various items, such as paper, printer cartridges, and postage, that are needed to support this project. These funds will also be used to purchase any recent books (such as Li and Racine's *Nonparametric Econometrics*) that are needed.

CURRENT AND PENDING SUPPORT

The principal investigator is currently pursuing research on the effect of Title IX on intercollegiate athletics, which is funded through July 31, 2008, by a research grant from the Women's Sport Foundation. While active, this project requires 20% of his time. He has no other current or pending support.

FACILITIES, EQUIPMENT, AND OTHER RESOURCES

The principal investigator (John Cheslock) will complete the project in Education 327A on the campus of the University of Arizona. Dr. Cheslock has dual-processor computer with 4GB of RAM that is capable of handling large data bases. In addition, he has STATA (v10) and Stat Transfer (v9). The research assistant (Matt Foraker) has a workstation in Education 327 and access to a computer with 2GB of RAM that is also capable of handling large data bases.

Dr. Cheslock and Mr. Foraker are both currently included on Dr. Cheslock's restricted use data license from NCES. All years of restricted NPSAS data are currently included on that license.

SPECIAL INFORMATION AND SUPPLEMENTARY DOCUMENTATION

Not applicable to the proposed project.