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The Effects of Financial Aid Amounts on Academic Performance

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The Effects of Financial Aid Amounts on Academic Performance

Abstract

Much research has been done investigating the impact of various forms of financial aid on college entry, eventual college graduation, and future earnings, yet little if any literature has explored the possibility of the presence of unintended academic outcomes—both positive or negative. This study looks to focus on one specific possible externality—financial aid’s impact on academic performance.

The Effects of Financial Aid Amounts on Academic Performance

Lane Coonrod

I. Introduction

“Poverty must not be a bar to learning, and learning must be an escape from poverty.” These words were spoken by President Lyndon B. Johnson in his “Great Society” speech of 1964 (Johnson, 1963-64). This idea, and many others expressed in his great society speech, have greatly influenced and continue to shape the way policymakers look at financial aid for higher education. Overall the higher education participation rate since the 1960’s has increased dramatically, with 24.4% of the population age 25 or older having a bachelor’s degree or more in 2000 compared to just 7.7% in 1960 (US Census Bureau, 2006).

Along with this increase in college graduation has come a dramatic increase in price as schools are forced to compete more for top-notch professors, to construct state-of-the-art facilities, and to deal with other associated costs. Illinois Wesleyan University (IWU), a small, private liberal-arts college located in Bloomington, Illinois, is not immune to such trends. In order to account for rising costs, the payment of past developments, and the expectation of future developments, IWU has increased its comprehensive fee (tuition, fees, and room and board) by an average of 5.6% over the last four years (Illinois Wesleyan University Catalog). A new visitor’s center is being built next to the campus Chapel just six years after construction of a new library. Capital costs like this one and increasing salaries are likely to continue indefinitely as IWU tries to always stay up to date and competitive with other institutions of similar size and quality. As a result, tuition is high and most families cannot afford to pay it in its entirety without help from an external source. Just as costs are rising in American higher education, so are the budgets of university financial aid programs

(College Board, 2006).

Financial aid, coming in the three major forms of grant, loan, and job, is what makes higher education affordable to the children of families who would otherwise be excluded by price. Financial aid in all three forms comes from a variety of sources, predominantly being institutional, state, and federal funds yet also including a local Kiwanis Club or private lender like a bank. Much research has been done investigating the impact of various forms of financial aid on college entry, eventual college graduation, and future earnings, yet little if any literature has explored the possibility of the presence of unintended academic outcomes—both positive or negative. This study looks to focus on one specific possible externality—financial aid’s impact on academic performance. Since the point of any institution is to learn, academic performance takes a central role in defining whether or not learning has occurred. Hence, any effects that a financial aid package may have on academic performance would need to be seriously considered when discussing policy changes that adjust the makeup of grant, loan, and job in meeting a student’s need. Any type of financial aid is better than none when there is a strong need, but the potential consequences are not always obvious.

II. Theory and Review of Literature

Financial Aid

Financial aid in higher education functions to make tuition affordable, but also is used by the university as a method of price discrimination. Price discrimination occurs when a firm with market power charges a different price to different customers in order to capture more consumer surplus than they would if they had just charged

a single price. If a firm changes its price to match the consumer's particular reservation price, the maximum price a consumer will pay for a good, then the firm leaves no room for the possibility of consumer surplus (Pindyck, 2005). Since families seeking financial aid are required to disclose information about income and wealth, colleges know how much a family has to spend on education. In reality, differing family values may determine a family's willingness to pay, but how much they have for spending in the first place is also important. Thus, an institution can charge a very high tuition and award financial aid on an individual basis such that the price of education is reduced to a level that is "affordable" in the eyes of the consumer. As Pindyck puts it, "students who are financially well off pay more for their education, while students who are less well off pay less" (2005).

Financial aid in American higher education has seen many changes and has evolved into a very complicated process both as a result of the accuracy of the measure of ability to pay and the ethical issues that surround the distribution of money. The FAFSA (Federal Application for Student Aid) is a document that all students must fill out if they intend to receive financial aid. The process can be so complex that it may deter students from ever applying for and receiving aid (Dynarski, 2006). Beyond determining the need of a student, however, there are several other important policy considerations that often require much debate. Affirmative action in higher education admission often overshadows the related debate about giving more money to promote the matriculation of ethnically diverse students. William G. Bowen and Derek Bok state that "what people have achieved often depends on the families they have grown up in, the neighborhoods in which they have lived, and the schools they have attended..." (1998). He goes on to add that "racial differences that have been long in the making continue to thwart aspirations for an open and just society" (1998). For this reason, many colleges and universities, including Illinois Wesleyan University, choose

to promote racial and ethnic diversity through increased grant amounts pegged as "diversity adjustments." These adjustments are additions that do not depend on future minimum grade attainment like merit scholarships and last all four years. The importance of diversity adjustments to this study is simply that increased grant amounts may have an effect on future academic performance, and these adjustments were not made at random. This introduces some bias in the data since a specific demographic was singled out and given more grant than others. This study recognizes this bias, yet the effect should be minimal since many unadjusted grants were also given to ethnic minorities.

Academic Performance

Academic performance of a student can be analyzed by thinking of a student as a firm having a production function in which the output is his or her academic performance, measured in this study through the proxy college grade point average, and the inputs are composed of the things that determine academic performance. Different firms (students) have different characteristics that require a different mix of inputs in order to maximize output. This means that if we assume that each firm maximizes output, we do not necessarily assume that each firm will use available inputs in the same way. Some students perform better in morning classes over evening classes; some students perform better through auditory learning techniques as opposed to reading a textbook; some students' performance may even be related by where they sit in a classroom. All of these decisions that students make are essentially ways in which they actively select inputs into their own production process, inputs which elevate or deter academic performance. The output of each class is a grade, and the average of several semesters' worth of outputs gives us a cumulative grade point average.

Academic performance doesn't always react to production function forces in a predictable manner. There is no way to correct for every little detail that influences how a student performs in classroom or cumulatively after having completed

several courses during a four-year period. Despite this, classifications and general relationships between the inputs and outputs of these production functions can be identified in some cases. Within this theoretical construct, two important and universal inputs into the production of academic performance are ability and effort. Ability can do nothing without a trace of effort just as effort accomplishes nothing without some ability to act as guidance. Ability also can be spread out among many skills other than academic ones just as effort can be applied in areas other than academics even sometimes at the expense of academics. These two inputs are in a sense analogous to capital and labor in that ability is much like human capital and labor is exertion of effort. One could even consider a constant productivity variable that captures the productivity of things other than inherent ability and effort e.g. the time-saving computers and printers in The Ames Library.

Consider the following production function:

$$Y = P f(A, E)$$

P in this function represents the constant productivity variable while A and E stand for ability and effort respectively. The direction of this study will be to find out whether or not financial aid amounts influence academic achievement. If this is found, then under this theoretical framework we may expect that financial aid actually influenced the two inputs of this production function, ability and effort.

Financial Aid and Academic Performance

Now that we have a general outline of how financial aid is used to price discriminate and how academic performance is produced using two core inputs, ability and effort, we can begin to examine the interaction financial aid and academic performance have on each other—the major purpose of this research. This study adds to the literature through exactly that: its effort to detect the relationship between financial aid amounts given to a student and that student's eventual academic performance. Connections between financial aid amounts and measurements of success have been

tested in the past. Peter Arcidiacono looked at how financial aid policies contribute to a student's decision to matriculate with a given university and their future earnings. The study focuses on black students mostly and finds that although there is a significant effect of financial aid on graduating blacks from college, there is little effect on earnings from race-based additional aid beyond the standard amounts (Arcidiacono, 2005). This suggests that perhaps additional aid beyond the amount that simply bridges the gap may not have much effect on future earnings. This could also say something about additional aid's effect on grade point average if we consider grades and future earnings to be linked. The three types of financial aid tested in this study are grant aid, loans, and on-campus jobs. Since these aid amounts must be used as explanatory variables, it is also necessary to include aid eligibility as is suggested by Alon (2006).

Before a discussion of aid eligibility, consider the effect of aid amounts on the two core determinants of grade point average—effort and ability. A possible hypothesis regarding the effect of additional amounts of grant is a positive relationship between amount and effort. It is unlikely that giving a student grant money will immediately change the student's ability *ceteris paribus*. However, an argument can be made that additional money will encourage and motivate a student to apply effort since the student realizes that it is essentially a gift rather than a natural right. Additionally this grant money may free up effort that would otherwise have been devoted to a job. On the other hand, complacency in the mind of the student is also possible. A student may take for granted the fact that alumni's donations are subsidizing four years worth of education. This idea comes up in much policy discussion about welfare and whether or not a welfare recipient is truly motivated to find a job or not. I take the stance that increases in grant aid amounts will have small positive effects on academic performance. I base this theory largely on observed behavior among peers and concede the bias associated with it.

Let us consider the ways in which the other types of financial aid affect the effort dimension of grade production. A loan is a legal contract that includes a promise that future payment with interest will be made in exchange for cash upfront. A student who takes out a loan or many loans will understand that the money is not a gift, merely a cash advance. This weakens the argument of complacency as it applies to the effect of loan aid on effort since, although procrastination is rampant on college campuses, it is also true that “money talks.” In the case of loans, it is more likely the case that there exists a positive relationship between aid amount and academic performance. As the debt accumulates, so strengthens the urgency and importance surrounding grades. Grades are often believed to be connected to future earnings, and there exists much evidence to substantiate that belief. Jones and Jackson find in their study of the determinants of future earnings that grade point average from a public university had a positive and significant effect on future earnings, even when correcting for a gamut of potential explanatory variables (1990). Since there exists this positive relationship between grades and future earnings, or at least many think it exists, I predict students will focus more effort on grades and achieve a better grade point average if they have higher loan amounts.

Work study jobs, on the other hand, take away from effort in that they place time and attention requirements on students that take away from potential effort spent solely on academics. There may be some possible returns to ability depending on the job, but I choose to disregard this and hypothesize a negative link between work study aid and grade point average. In the literature on this subject, Stinebrickner et al. identifies several biases that can come up in doing research on the effects of work study on academic performance (2003). One bias that may apply to Illinois Wesleyan University is that students don’t always complete all the hours that are required to receive all the money they are offered. The data in this study includes only work study money offered

whereas loan and grant aid data is money actually received. Lundberg finds no significant effect of jobs on academic performance up to a maximum of 20 hours a week (2004). This study, however, involved non-work study jobs and was conducted on a population that is an average of three years older than that of Illinois Wesleyan University. This three year gap may be enough to assume a significant difference in maturity levels associated with time management skills.

A student who receives high levels of grant due to a high level of aid eligibility may present a problem for researchers since aid eligibility is the biggest determinant of need based aid and may also suggest a lower socioeconomic status. The theory presented earlier, however, expects a small positive effect for increased grant aid amounts. Dealing with this problem of mixed signals is easy if aid eligibility and aid amount can be broken down into two separate constructs—each independent of the other variable. Alon uses an instrumental variable to fix this problem, but I will not create such a variable of my own. Instead, I will rely on the institutional methodology for determining financial aid eligibility that is used in analyzing an Illinois Wesleyan University student’s need. This methodology uses data such as parents’ income, student’s income, family assets, and the number of other children currently enrolled an institution of higher education in determining the gross need of a student. The same methodology is applied to all students who will out a FAFSA and the university’s own proprietary document—the Profile Form.

Other Potential Influences on Academic Performance

In testing for whether or not a given variable affects academic performance, this study identifies what potentially affects the level of ability, the level of effort, or what other factors might influence academic performance. Certain classes that are grouped within the same major are taught by the same professor or are biased towards producing better grades given certain mixes of inputs. In other words, each department may have characteristics that produce a higher or

lower grade point average than other departments. Because of the number and diversity of general education courses available at Illinois Wesleyan University, it is not feasible to weight each class's difficulty, each professor's difficulty, each topic's difficulty, etc. However, since a large concentration of courses corresponding to a student's major are similar and are usually specific to one department, this study uses major as an explanatory variable.

Within this analogy of a production function for academic performance, major is a corrective component similar to a variable that might account for the market structure of a given industry rather than a measure or determinant of effort or ability. A dummy variable for presence of a double major is also included in order to pick up possible influences on academic ability of double-majoring. Double-majoring is not easy to do, yet is somewhat common at IWU. Since double-majoring requires extra planning and focus it is most likely a sign of a student with either good time management skills or high motivation to achieve something most do not. Good time management skills are part of ability and motivation is certainly a part of effort. Thus, presence of a double major will likely have a positive relationship with academic performance.

Since one is usually in school for 12 years before college, a student entering college likely comes with a great amount of ability from high school and schools previous to that. It is feasible that the ability a student has going into college is a major part of the ability a student will have throughout his or her college career. In considering a measure for ability, one must recognize that there exists some endogeneity in the ability variable, though. Over time previous ability coupled with effort can raise present ability to a higher level. Clearly, ability is dynamic and changes significantly as one progresses through college. Measuring a dynamic variable like this is tough since any static point gives merely a snapshot of reality. However, a measure of academic ability taken before a student ever enters college would provide an initial benchmark for where each student

starts. Wayne Grove et al (2006) assert in a work published in the *Journal of Economic Education* that SAT scores (or equivalent ACT converted scores) are the best proxy for academic aptitude. Since this proxy is available for all students who graduated from Illinois Wesleyan University in 2007 and is always taken before entering college, this study incorporates it into its model as a key explanatory variable. Scores from the SAT exam are easily converted into equivalent ACT scores through use of an official, institutionally used translation chart. This chart is distributed by the College Board and is commonly accepted by institutions of higher education across the nation.

When doing a formal study on financial aid's impact on college success there is an inherent susceptibility toward bias coming from the close relationship between need-based eligibility for aid and actual amounts of aid given (Alon, 2007). According to Alon, there is danger in simply using aid amount as an explanatory variable since this measurement has two dimensions, one explicit and one implicit. The explicit one is obviously the dollars actually distributed to a student whereas the implicit dimension is the relation that this amount has to overall eligibility for aid. Alon states that, "the same factors that enhance need-based aid eligibility—such as economically disadvantaged family background—are negatively related to persistence and graduation." Based on this assertion, and inferring a possible connection between persistence and graduation and academic performance, the presence of a negative impact of need-based eligibility and a positive impact of aid dollars distributed may obscure relationships and lead to inaccurate judgments. Including proxies for both grant amount and aid eligibility (financial need) is necessary even though they are closely related for the population of students with need. Including both variables should carve better results, not just bias coefficients because of collinearity between the two variables.

III. Data

All students included in the study are from the graduating class of 2007. International students are not included as they abide by much different financial aid policies and would therefore not relate directly to the domestic data set. Not all students receive financial aid through the Office of Financial Aid and thus, do not show up in their records. These students are not omitted from the dataset, however, since this would introduce a large bias in the study. Instead, they are included and have amounts of zero for each of the financial aid categories. Unfortunately, only students who came to the university as a first year student in the fall of 2003 are included since this was the data provided by the Office of Financial Aid. Including other students, like those who graduate in three years, might introduce bias in view of the fact that these students would only have accumulated three years worth of aid when others would have four years worth.

Illinois Wesleyan University graduated 509 students during the school year 2006-2007. This included students who took the traditional route of staying eight semesters, those who graduated a semester early in December, and those who met the requirements for graduation shortly after the official graduation ceremony. These students also graduated with 39 distinct majors. In many cases, these majors differ only slightly from another major that is still counted as being a unique major. An example of this is Business Administration and Risk Management. The first five courses necessary to complete the major requirements of these two majors are the same. Thus, for the purposes of this study, they can be grouped together since the students graduating with these majors were peers in the classroom, doing the same homework assignments and receiving grades from the same teachers. In other cases, there may be a strong enough connection between majors in spite of having a minority of classes overlapping.

The following categories were used in defining differences in courses, teachers, and degree of difficulty:

- BUS**—Accounting, Business Administration, International Business, Risk Management
- ART**—Music, Music Composition, Music Education, Orchestral Instruments, Piano Performance, Voice, Theatre Arts, Art, Theatre Design/Technology, Acting, and Music Theatre
- HUM**—English Writing, English Literature, Philosophy, Religion, Sociology, Anthropology, Economics, Political Science, International Studies, History, Women’s Studies, Environmental Science, and Greek & Roman Studies, Hispanic Studies, French and Francophone Studies
- NUR**—Nursing
- SCI**—Biology, Chemistry, Physics, Mathematics, Psychology, and Computer Science
- EDU**—Educational Studies

These groupings are based mostly on the similarity of subject matter and overlap of teachers and curriculum. Nursing is divided out even though its curriculum requires certain biology courses since it is a separate school at IWU. Educational Studies also has its own set of professors and concentrations in any subject area are not available. All classifications will be represented with a dummy variable with double majors having their own separate double major variable that accounts for possible effects of double-majoring. The natural sciences are divided from the Humanities even though some majors within each classification contain overlapping courses. The Humanities category will not have a dummy variable and thus all coefficients from the regression can be interpreted as the effect of that major in reference to being a Humanities major.

Grants are given to a student either on the basis of need, merit, or in some cases a combination of the two. Merit based grants are based mostly on high school ACT score, so the ACT variable should account more directly for academic ability of students who qualify for merit-based aid. Need-based aid, however, depends mostly on aid eligibility, which is also included in this study. Most of what makes grant amounts not perfectly correlated with either ACT or aid eligibility is the discretion of the admissions counselors who either

choose to offer the standard amount or send a student's file before a board of administrators who can alter the amount if deemed necessary. Grant amount alterations are frequent and represent the subjective side of financial aid. Counselors may ask to give extra money to a certain student who is thought to have great potential, outstanding skills not tested by the ACT, or even reasons relating to a conflict of interest, (of course never at good ol' IWU though). As well, some grants are from local sources and are not factored into aid eligibility and may not depend on ACT score e.g. community service recognition scholarships. Herein lies the variation that makes grant amounts a unique measurement and not just a function of two other independent variables.

IV. Empirical Model

This study will test the following hypotheses:

1.) An increase in the amount of grant aid awarded to a student when holding all other things equal will have a slightly positive effect on academic performance.

2.) An increase in the amount of job aid will have a significant negative effect on academic performance.

3.) An increase in loan amount, not counting parent loans, will have a significant positive effect on academic performance.

Other expected outcomes that do not relate directly to the research question include:

1.) ACT score is expected to have a high positive correlation with college grade point average since ACT score captures academic ability.

2.) Differences in major will account for a significant inflation or deflation of grade point average. Specifically, I expect lower grades to come from the sciences, but that theory is based only on what I see as a general IWU campus perception and may not be correct.

3.) Students who double major will likely have a slightly higher grade point average than those who do not double major.

4.) Aid eligibility may have an effect on academic performance, but its inclusion in this study is meant to see whether increases in grants have a certain effect or whether it is grants' negative

Table 1: Variables

<i>Variable Definitions</i>	<i>Definitions</i>	<i>Expected Sign</i>
<i>Dependent Variable</i>		
GPA	Cumulative final grade point average	
<i>Independent Variables</i>		
ACT	Best score from high school ACT exam	(+)
BUS	Business major=1, not=0	(N/A)
ART	Art major=1, not=0	(N/A)
EDU	Education major=1, not=0	(N/A)
NUR	Nursing major=1, not=0	(N/A)
SCI	Science major=1, not=0	(N/A)
DblMajor	Double major=1, not=0	(+)
IMNeed	Amount of financial need as determined by IWU(-)	
GRNT	Amount of grant from all sources	(+)
LOAN	Amount of loan not taken out by parents	(+)
JOB	Amount of job aid offered to a student	(-)

correlation with aid eligibility that is the source of the true effect. Since need-based grants are based almost exclusively on aid eligibility, we can dig deeper and reveal more credible results if this variable is included. Some multicollinearity may exist if only students with need are analyzed, but the significance of the variable for grant amount is what is really sought after.

5.) Each major classification will have a small, yet significant, effect on grade point average. Even though everyone knows Economics is the hardest major, I do not make predictions about this as it is absolute truth.

Table 1 presents variable definitions and the expected sign of each variable. The following equation shows the dependent variable as a function of the independent variables listed in Table 1. The model will use OLS regression technique to test for coefficient values and their significance.

$$\text{GPA} = \beta_0 + \beta_1 \text{ACT} + \beta_2 \text{BUS} + \beta_3 \text{ART} + \beta_4 \text{SCI} + \beta_5 \text{EDU} + \beta_6 \text{NUR} + \beta_7 \text{DbIMajor} + \beta_8 \text{IMNeed} + \beta_9 \text{GRNT} + \beta_{10} \text{LOAN} + \beta_{11} \text{JOB} + \varepsilon$$

(ε = error term)

V. Results

Coefficients, significance levels, and relevant comments are included in the following set of three tables which describe regressions done on the entire 447 student data set. Three regressions are done in order to highlight the effect of the control variables. Table 2 shows the results of all three regressions.

Upon running the first regression, the results appear to be robust, yet this is not all that surprising considering there are no corrective variables in the model. The signs on the variables are contrary to the hypothesis with the exception of the GRNT variable. I knew that the GRNT variable would be very significant after the first run since many students' grant amounts factor in how they performed on the ACT. Since ACT is the best proxy for academic ability according to the literature, it makes perfect sense that the coefficient of the GRNT variable would be positive and very

significant. LOAN and JOB were also significant, but had a different sign than I expected. This may have something to do with a connection between loan amounts, job amounts, and a student's financial need. A needy student will get offered a job and a loan whereas a student without much need will likely not get the same offer. Hence, the negative sign on the coefficients of the LOAN and JOB variable reveal that LOAN and JOB are acting as an unintentional proxy for the effect that financial need has on academic performance. The constant value of 3.415 represents the expected grade point average of a student without grant, loan, or work study aid. There were 22 students included in the data set who did not receive grant, loans, or a work study job.

The second model introduces the first set of corrective statistics—ACT and IMNeed. If nothing in the first model had any true effect on academic performance, then the two corrective variables ACT and IMNeed should be highly significant and potentially eliminate the significance of the first three independent variables. As it turns out, GRNT was the only of the three original variables that remained significant. As expected, ACT had a highly significant, positive coefficient. IMNeed also came up significant and agreed with the hypothesis that the less needy financially also perform better. The coefficient on the ACT variable means that raising an ACT score one point will translate into a grade point average 0.036 higher than before. Thus, a student who scores three points higher on the ACT than another student is expected to have a grade point average about a tenth of a point higher than that same student. With an R^2 of only 0.196, though, there is clearly still much to be explained in the model. This R^2 means that 19.6% of the variation in grade point average is being explained by the variables present in the model.

The final model in this set represents the full model with all corrective variables included. The significance and magnitude of the coefficients for GRNT, ACT, and IMNeed do not change much, but some of the new variables do add to

the results of the study. The NUR variable, the BUS variable, and, to a lesser degree, the SCI variable all came out to be negatively related to the grade point average of a humanities major. The EDU variable is positively related to grade point average with reference to the expected grade point average of a major in the humanities. Perhaps the faculties of the first three departments have higher standards than the humanities departments. Otherwise, it could also be true that students have either lower ability or put forth less effort than

the students of other departments. Regardless of which is really the case, it was not the goal of this study to examine the link between departments and academic performance, rather it was merely a means to correct for potential relationships that may exist. As an additional note, regressions were also run separating out some of the majors from the HUM category, but nothing valuable to the study was found in doing this. Consequently, HUM is left as is and is used as the omitted variable.

The final result from the third model is the significant positive relationship that double majoring has on academic performance. This result fits well within the construct of the theoretical model where ability and effort are the two principal inputs. Using the presence of a double major as a signal of having effort levels is a safe bet, and the result is consistent with the hypothesis. The magnitude of the coefficient is small, yet worthy of attention since differences in grade point averages may carry heavy weight in a competitive labor market. More relevant to this study is the result that neither loan amounts nor job amounts have a significant effect on academic performance. Although little research like this has been done using loan amounts as a determinant for academic performance, job amounts have been shown in recent studies to have little to no effect on grades.

Table 3 dissects the data into two categories depending on whether or not the student had financial need while at IWU. This examination of the data split into two categories helps us separate the students into subsets that likely respond to different incentives and therefore behave in distinct ways. The regression done on students who have need shows fewer significant results than does the third regression

Table 2: Results (All Students)

<i>B-coefficients</i>	<i>Model 1</i>	<i>Model 2</i>	<i>Model 3</i>
Constant	3.415	2.385	2.528
GRNT	0.003 (4.711)***	0.003 (3.477)***	0.003 (2.859)***
LOAN	-0.003 (-3.342)***	-0.001 (-1.374)	-0.001 (-0.897)
JOB	-0.092 (-2.535)**	0.033 (0.820)	0.032 (0.814)
ACT		0.036 (6.227)***	0.034 (5.887)***
IMNeed		-0.009 (-3.506)***	-0.008 (-3.224)***
BUS			-0.090 (-2.271)**
ART			0.043 (1.001)
EDU			0.178 (2.029)**
NUR			-0.240 (-3.069)***
SCI			-0.061 (-1.671)*
DblMajor			0.054 (1.503)
No. Observations	447	447	447
R ²	0.074	0.196	0.248
DW	2.064	2.058	2.071

Notes:

1.) t-values in parentheses for all models

2.) ***Significant at the 1% level, **Significant at the 5% level, and *Significant at the 10% level

3.) DW is the Durbin-Watson statistic

run on the full dataset. GRNT no longer has a statistically significant effect on grade point average, whereas students without need retain this relationship. It is likely that what is driving the statistically significant relationship between GRNT and GPA in the full dataset is the population of students who do not have need. Since the grants of the students without need depend predominantly on ACT score and high school grade point average, it is possible that this result is simply more proof that ACT is a key determinant of academic performance in college. However, this possibility must remain just that—a possibility. The reason is ACT is already in the model as an explanatory variable and should be sufficient in capturing its own effect. It should be noted that, despite being very significant in every other model run, ACT was not significant in the regression run on the students without need. This suggests that the original explanation is correct—GRNT is overshadowing ACT’s true effect.

There are some students who are recognized as being National Merit Scholars in high school and receive an extra \$4000 because of it. This could account for some of the additional effect that grant amounts may have since being a National Merit Scholar is a sure sign of strong academic ability. The problem with this argument is fewer than 10% of students without need are National Merit Scholars. There are also students who receive full tuition scholarships for music ability, but they only number four and therefore could not drive an entire 245 student dataset.

The very interesting result found in the

Table 3: Results (Subset)

<i>B-coefficients</i>	<i>Students with Need</i>	<i>Students without Need</i>
Constant	2.269	3.120
GRNT	0.001 (0.790)	0.006 (4.122)***
LOAN	0.000 (0.355)	-0.003 (-2.400)**
JOB	0.065 (1.212)	-0.043 (-0.726)
ACT	0.043 (5.844)***	0.009 (0.877)
IMNeed	-0.009 (-2.634)**	
BUS	-0.046 (-0.857)	-0.145 (-2.557)**
ART	-0.053 (-0.900)	-0.042 (-0.632)
EDU	0.205 (1.621)	0.132 (1.122)
NUR	-0.256 (-2.516)**	-0.218 (-1.811)*
SCI	-0.093 (-1.856)	-0.038 (-0.700)
DbIMajor	0.057 (1.053)	0.050 (1.040)
No. Observations	245	202
R ²	0.242	0.322
DW	1.943	2.140

Notes:

- 1.) t-values in parentheses for all models
- 2.) ***Significant at the 1% level, **Significant at the 5% level, *Significant at the 10% level
- 3.) DW is the Durbin-Watson statistic

subset of students without need is the coefficient on the LOAN variable. Apparently, higher loan amounts are negatively correlated with grade point average. This result does not support my hypothesis, but there may be other forces at work here. Since students with higher ACT scores get more grants, they also have less to pay. If they have less to pay, they will inevitably take out less in loans. Not all loans are need based, and a student without financial need may still want to take out a loan in order to ease the financial burden on the

family which, at least on paper, has no need. It is hard to distinguish whether LOAN is significant in determining academic performance because of something actually having to do with taking out a loan or because of the common circumstances that borrowers find themselves in. This would have to be the topic of further research in order to say for sure, but for now it can at least be said that what the literature suggests about ACT scores and financial need is supported by this study. The hypotheses presented about the impact of financial aid amounts appear to be for the most part unsupported. The best way to tell would be to perform similar tests on datasets from other colleges and universities from around the country.

VI. Conclusions

Although the variables LOAN and JOB did not come out to be significant when using the full data set, this result is equally as telling for economists, administrators, and students. By showing that loan amounts and job aid amounts have no significant connection to academic performance puts to rest the possible argument that they do. Administrators will better know how their decisions affect the welfare of a student by limiting the number of factors that are considered when considering how to package financial aid for a student. Policies that took a cautionary stance on whether or not bogging down a student with hours at a work study job would hinder academic performance can be adjusted to pay closer attention to other more relevant pros and cons. Whereas a significant positive relationship between loan amount and grade point average might suggest giving more loans is good, this study rejects that claim and even presents a possible argument for the opposite mode of thinking. Either way, this study shows that other topics of consideration might deserve the most attention, (think too much debt after graduation for example).

Other results, like that of ACT being a significant determinant of college grade point average, may be useful to departments within IWU but outside the financial aid office. Policies

promoting applicants with higher ACT scores will most likely translate into students with better grades in the future. The role advisors play in advising a student on whether or not double-majoring is a good idea changes when the data suggests double-majors do better. The significance of the IMNeed variables suggests that financially needy students may need extra help of some form in order to bridge the gap between them and their peers. The policy implications are not limited to the Office of Financial Aid, but can be looked at by all offices and departments on campus.

This study certainly adds to the literature in verifying the conclusions about ACT, the effects of having an on-campus job, and financial aid eligibility. However, there are many venues for potential future research. According to the literature, other externalities of increased amounts of loans taken out by an undergraduate exist and could be explored in the context of IWU. The dataset could be expanded beyond IWU in order to establish more general conclusions. Other determinants to academic performance could be explored as well, so long as viable data is obtainable. Essentially, there is no limit to the discussion surrounding the hot topic of financial aid. There is always a limit to what researchers can determine, however, but this should not stand in the way of projects like these.

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