The Short Term Effect of Educational Debt on Job Decisions

Alexandra L. Minicozzi
University of Texas at Austin
aminicoz@eco.utexas.edu

November 16, 2002

Abstract

This paper studies the effect of educational debt on college attendee's future wages and wage growth. Given a set of feasible income profiles from which to choose, I hypothesize that men who took on larger loans to pay for college are subject to higher borrowing interest rates and thus will prefer income profiles with higher initial earnings, sacrificing future income growth, relative to men who did not take on large educational debt. Using data from the 1987 National Postsecondary Student Aid Survey, I find that higher educational debt is associated with higher initial wages the year after finishing school. Moreover, given a high initial wage, higher debt decreases predicted wage growth over the next four years.

1 Introduction

The passage of the Higher Education Act of 1965 established the Guaranteed Student Loan (GSL) Program, later renamed the Stafford Loan Program, and a system of means-tested grants, now known as Pell Grants. Both programs were intended as means of subsidizing college costs for low income youth, the first through lower interest rates for college students and the second as a lump-sum transfer. While student financial aid at the postsecondary level in the United States has become more common, aid packages have shifted away from grants and towards student loans. In the last decade, loan aid increased by 125% (in real dollars) and grant aid by 55%. In the 1980-1981 academic year, student loans comprised 41% of total aid available; they are responsible for 59% today. This trend may be due in part to institutional changes: Guaranteed Student Loan Program changes have expanded loan eligibility and restrictions on the maximum loan amount have been relaxed.

Given the increasing prevalence and size of student loans, one wonders what effect these loans may have on students later. For example, one might suspect that large undergraduate debt would deter students from pursuing graduate studies. Partially to address this concern, Subsidized Stafford loans do not accrue interest during years in graduate school. Policy makers also have an interest in predicting and avoiding loan default. While the effects of educational debt on the future schooling and credit rating of the borrower are obvious issues to consider, the influence of educational debt may be even more far-reaching. For example, educational debt may affect borrowers' job choices post-schooling.

If the loans were subsidized then student borrowers are responsible for monthly repayment of their GSL almost immediately after finishing their schooling (the grace period ranged from 6 to 9 months).[1] The system is structured such that monthly repayment is constant over time. The average monthly GSL repayment of former students in the 1987 National Postsecondary Student Aid Survey is $226 (in 1983 dollars). Often, these initial repayments come at a time when the former students have few or no assets or savings and are starting a new job. In the extreme case, those burdened with heavy educational debt will be liquidity-constrained - they will be unable to borrow the necessary amounts to smooth consumption over time. More realistically, those with large loans will be able to borrow but at higher interest rates than those without loans. In the spirit of occupational choice models such as Orazem and Mattila (1991) and Flyer (1997), I assume that individuals choose from among various life-cycle earnings profiles. Thus, given the option, these liquidity-constrained individuals, and those facing higher borrowing interest rates, may prefer jobs with high initial earnings, even if they have to sacrifice earnings later in life.

This argument could apply to those in college, law school, or medical school. Several studies estimate the effect of debt on medical specialty choice and legal sector career choice. This paper conducts the first study of the effect of debt burden on a college student's subsequent job decisions. Using data from the 1987 National Postsecondary Student Aid Survey, I estimate the impact of educational debt on initial wages and on four year wage growth for men.

[1] Unsubsidized Stafford loans are not need based and accumulated interest is immediately capitalized.

I expect to find that, all else equal, because those with high debt prefer relatively front-loaded earnings profiles: the amount owed will be positively related to initial wages (earnings) and negatively related to wage growth (earnings growth). My empirical results lend support to this hypothesis. I find that holding constant race, education, school quality, etc. expected log initial wage rises and expected four year wage growth declines with debt.

There are two policy implications of my findings. First, the current college financial aid system is inefficient because it distorts the matching of workers to jobs. For example, men who financed their college education largely through loans have a greater disincentive to invest in further training and may not pursue careers for which they might be suited. Second, the current system requires equal monthly repayments but a restructuring to ballooned payments could potentially reduce welfare losses to debtors without substantial increases in the cost of the program.

2 Literature Review

The literature on educational debt and job decisions is recent and has focused on specialty choice of those in medical school or sector choice (profit versus non-profit) by new lawyers. In each case, the empirical evidence on the effect of educational debt is mixed. A related literature on the relationship between college financing and schooling attainment is also recent and has generally found no significant impact of borrowing constraints on the college attendance decision.

Loans account for the majority of financial aid to medical students. Of the 1997 U.S. medical school graduating class, 82% incurred debt, 46% of whom had a debt level higher than $75,000. The general approach to uncovering the effect of debt on medical job decisions is to estimate a conditional logit for the decision to become a primary care physician. Several studies (e.g. Rosenthal, Marquette, and Diamond (1996), Colquitt, et al. (1996), and Woodworth, Chang, and Helmer (2000)) found that medical students with large debt are less likely to choose specialties that have a long training program or to become general practitioners in poor communities. In fact, based on these studies, programs were created to reduce loan repayments for those choosing to work in communities with great need for medical care. However, other studies do not find a statistically significant effect of debt on choice of specialty (e.g. Spar, Pryor, and Simon (1988) and Kassenbaum, Szenas, and Schuchert (1994)). The contradictory results on the effect of debt on medical student specialty choice can be attributed to the (1) aggregation of specialties with different training periods and expected incomes, (2) change in lending program policies over time and thus across studies, and (3) different model specifications.[2]

Debt levels have two opposing effects on specialty choice. One hypothesis suggests that students would pursue primary-care specialties because completion of residency training occurs sooner and allows one to earn a high salary and thus repay debt quicker. A second hypothesis is that students with debt leave primary care fields because the higher expected permanent income from other

[2] Although each researcher chose to estimate a conditional logit model, the debt variable enters in some models as dollar amount and in others as dollar amount above cut-off levels. The issue of how to model the effect of debt on career decisions will be revisited in the empirical section of this paper.

specialties would reduce the long term financial strain of loan repayment. The classification by specialty aggregates jobs with both low initial wages and much higher expected lifetime earnings thus the overall effect could be small even if the individual, opposing effects are not. Clearly, aggregation into specialties complicates identification of the effect of debt. However, the problem is lessened for my analysis because job decisions of college educated men, unlike medical specialty choice, could easily include two options with nearly equal expected lifetime earnings but different income streams.

Fewer papers are devoted to uncovering the effect of law school debt on career decisions. Because Kornhauser and Revesz (1995) is representative of findings and is the most comprehensive, I will focus discussion on this paper alone. Using data for University of Michigan and New York University law students, they estimate conditional logit models for choice of working in non-elite-for-profit versus non-profit sectors and for elite-for-profit versus non-profit sectors. Only the first job is considered. Controlling for age, race, gender, class rank, wage differentials, and program participation, they find that the dollar value of debt incurred for law school graduation has no significant effect on the relative probability of men choosing a non-profit first job. Conversely, their results suggest that female lawyers are less likely to choose non-profit sector jobs if they have debt burdens.

While the Kornhauser and Revesz findings suggest that debt burden does not play a large role in job decisions for lawyers, several caveats should be kept in mind before generalizing. Earnings in the for profit sector are generally both higher initially and exhibit higher growth over time than those in the non-profit sector such that the sector decision is essentially one of a higher predicted permanent income versus potentially more attractive job attributes outside of salary. That is, in focusing on sector choice of first job as a lawyer, these models are unable to identify the role debt plays in demand for front-loaded earnings profiles. Secondly, preferences over working in profit and non-profit sectors probably play a larger role than preferences over shape of earnings profiles. In support of this, Kornhauser and Revesz find that plans to work in the non-profit sector at time of entrance to law school and participation in public interest programs are strong, positive correlates of later choosing a job in the non-profit sector.[3]

Based on their coefficient estimates for men, Kornhauser and Revesz calculate a negligible effect of forgiving educational debt on the percentage of lawyers entering the non-profit sector. In estimating this impact, they have ignored the indirect effect on possible entrants to law school.[4] That is, recognizing the removed financial barrier, those with interest in working in the non-profit sector may be more likely to enter law school.

In fact, there is a burgeoning literature on the impact of borrowing constraints on educational attainment (e.g. Cameron and Heckman (1998), Keane and Wolpin (2001) and Cameron and Taber (2001)). Although models differ substantially, researchers have generally found that borrowing

[3] Additionally, Kornhauser and Revesz' empirical model does not allow for a differential impact of larger debts on sector decisions. Lastly, only law students from two elite law schools are represented in the sample.

[4] Sauer(1998) models legal education and career decisions as the solution to a dynamic optimization problem then estimates the model using data from the University of Michigan Law School. He finds evidence that loan forgiveness programs would cause adverse selection into law school.

constraints affect consumption and work decisions of college students but have little impact on the college attendance decison itself.

3 Illustration of the Mechanism

There are two mechanisms through which debt amount may affect intial wage and wage growth. For example, those with high debt may be more willing to substitute other job amenities for increased wages - a compensating differential story. Unfortunately, my current dataset does not contain information on job amenities so I do not estimate the differentials. Secondly, debt may lead to higher effective borrowing interest rates which, in turn, increase debtors' incentives to work in jobs which have higher initial wages but lower wage growth.

There are three reasons why individuals with large student loans may act as if they are facing higher interest rates. First, lending institutions may be offering them higher borrowing rates. Borrowing interest rates in the U.S. are based on an individual's Fair Isaac Score (FICO). Given similar profiles of credit and a minimum number of credit cards, an individual with higher debt from school loans has a lower FICO score and will be offered a higher borrowing interest rate by lending institutions. Second, the wealth risk caused by debt may cause debtors to behave as if they are faced with an interest rate above the expected market rate. Lich-Tyler (2002) models the effect of uncertainty on life-cycle labor supply and his empirical findings support this hypothesis.[5] Lastly, children may borrow from their parents rather than a lending institution if their parents offer favorable rates. Men with large school loans probably have more difficulty in securing a loan from their parents which implies that their effective borrowing interest rate is probably higher.

In this section, I present a simple illustration of why those with high educational debt will prefer earnings profiles that are front-loaded (higher initial earnings with lower growth) relative to those with little to no educational debt. Treating debt amount (and thus educational attainment) as exogenous, individuals optimize by choosing their most preferred income stream from a feasible set. Higher debt causes individuals to face higher interest rates on future borrowing. Thus, for a given set of income growth profiles, those facing higher interest rates prefer flat profiles while those who do not have much debt prefer high growth profiles. This mechanism is supported by the Colquitt et al. (1996) finding that those with debt from unsubsidized loans are more likely to become primary care physicians (choose higher initial wage but lower growth wage profiles).

This result is illustrated by a simple three-period maximization problem. Educational debt must be repaid in equal installments in the first two periods.[6] Individuals choose how much to additionally borrow from future earnings in the first two periods subject to individual-specific,

[5] His findings also suggest that debtors have a greater incentive to work thus one might expect to see higher initial work hours for those with large student loans. Increased initial work hours may result in higher wage growth and suggests estimating efficiency wage regressions. Unfortunately, the NPSAS only has average hours at job rather than annual hours worked so this hypothesis would be difficult to test.

[6] There is no option of early repayment of student loans in this model. This constraint is not binding given my specific choice of interest rate and income stream in the numerical example.

period-specific interest rates. Non-educational debt must be repaid in the following period. Nobody can default. Individuals choose the income stream from those offered to maximize utility. For tractability, I have selected the log utility function but the results generalize. The maximization problem is:

$$\max \ln(Y_1 + L_1 - D) + \beta \ln(Y_2 + L_2 - R_1 L_1 - D) + \beta^2 \ln(Y_3 - R_2 L_2)$$

where (Y_1, Y_2, Y_3) is income in period 1, 2, and 3; D is the share of school debt to be repaid each period; (L_1, L_2) is the amount borrowed in period one and period two, respectively; β is the discount rate on utility; (R_1, R_2) is the individual's interest rate for borrowing in time period 1 and 2.

Through on-time repayment and maintenance of good credit, an individual with larger school loans can, over time, reduce the interest rate offered on additional borrowing. My model reflects this phenomenon. For the high debt individual, $R_1 > R_2$, and both interest rates will be no lower than the interest rates offered to the low debt individual in either period. Given the income streams offered, the individual interest rates, and the school loan repayment plan, individuals choose the income stream which maximizes utility.

The FOC's yield solutions to L_1 and L_2:

$$\begin{aligned} L_1 &= \frac{(\beta+1)(Y_2 - D - \beta R_1 Y_1 + \beta R_1 D)}{R_1(\beta^2+\beta+1)} + \frac{Y_3 - \beta R_2 Y_2 + \beta R_2 D}{R_2 R_1(\beta^2+\beta+1)} \\ L_2 &= \frac{Y_3 - \beta R_2 Y_2 + \beta R_2 D}{R_2(\beta+1)} + \frac{\beta(Y_2 - D - \beta R_1 Y_1 + \beta R_1 D)}{(\beta^2+\beta+1)} \\ &\quad + \frac{\beta(Y_3 - \beta R_2 Y_2 + \beta R_2 D)}{R_2(\beta+1)(\beta^2+\beta+1)} \end{aligned}$$

The amount borrowed in the first and second time period, L_1 and L_2, increase with school debt and decrease with interest rate. The relevant list of offered income streams depends on the individual's college performance (including grades, major, school quality), occupational choice, and local labor market conditions. As a simplification, I ignore the labor-leisure trade-off and characterize the income stream (Y_1, Y_2, Y_3) as an initial wage, Y, and a constant wage growth, G.

The model's prediction of the relationship between educational debt and earnings profiles is best illustrated with a numerical example. Assume there are two individuals with exactly the same characteristics except for their loan amounts. Let the school loan repayment plan for each period be equal to 500 for individual A and 2500 for individual B. Let $R_i(500) = 1.07$ for $i = 1,2$, $R_1(2500) = 1.13$, $R_2(2500) = 1.07$, and $\beta = .9$. Let the feasible set of income profiles for both A and B be: $\{(10500, 10500, 10500), (10000, 10520, 11067)\}$. The first income profile is flat while the second has a lower initial income and a growth rate of 5.2%.

Individual A, with total school loan repayment of $1000, will choose the steep income profile because it yields higher utility than the flat income profile. Individual B, with total school loan repayment due of $5000, will choose the flat income profile over the steep. More generally, his desire to smooth over consumption coupled with higher borrowing interest rates causes individual B (high debt type) to choose front-loaded income profiles.

4 Data

My data source is the 1987 National Postsecondary Student Aid Survey, NPSAS(87), published by the U.S. Department of Education, National Center for Education Statistics. While later surveys (1990, 1993, and 1996) sample students enrolled in postsecondary schooling in the year prior to the survey, NPSAS(87) includes an Out of School Student Loan Recipient Survey, SLRS. The SLRS collects information (including employment histories) on 8,223 former students who applied for and received a Guaranteed Student Loan (GSL) between 1976 and 1985. Additional information on the respondents, their parents, and the institutions they attended is found in the Student, Parent, and Transcript data files. The multistage probability sample was designed to include a representative sample of students from public and private two- and four-year institutions.

Two additional data sources helped supplement information included in the 1987 National Postsecondary Student Aid Study. The NPSAS(87) identifies each respondent's school identification code (FICE) and thus can be linked to any school-specific information. Using the Institutional Characteristics survey also published by the National Center for Education Statistics, I added several postsecondary school characteristics (such as tuition and institution type). Moreover, a measure of school quality was added using rankings in U.S. News and World Report's October 15, 1990 issue.

Several sample restrictions were made to insure applicability of the sample to the question of this paper: What is the effect of educational debt from postsecondary schooling on men's early job decisions? First, I excluded those who did not pursue at least a two-year degree. Programs lasting less than two years provide only short term vocational training and are relatively inexpensive. Secondly, I excluded men who finished their schooling after age 35. The majority of these men continue working their full-time job during and after obtaining additional schooling (often certification). Their funding decisions, work decisions, and outside resources are not representative of the younger men in my sample. Only 3,508 of the 8,223 NPSAS-SLRS respondents are men who finished formal schooling by age 35 and pursued a two- or four-year college degree. Eighty percent of these men pursued (but did not necessarily obtain) a bachelor's degree.

The sample was further restricted to exclude men whose last year attending school was after 1983 (only 35% of the sample satisfied this condition), and those missing data on age, race, degree, amount received in Guaranteed Student Loans, or earnings at each job for the first four years post-schooling. These restrictions ensure that at least four years of earnings information are available, but still allow for unemployment spells. The sample size reduces to 1,006. Eighty-six percent of these men report their race as white and over half receive bachelor's degrees.

Variable definitions along with sample means and standard deviations are reported in Appendix Table 1. All nominal amounts have been converted to 1983 dollars. Figure 1 displays the distribution of total amount in Guaranteed Student Loans. Thirteen percent of my sample received additional loans to fund their postsecondary education for which they, and not their parents, were responsible for repaying. The loan variable used in the regressions, *rloan*, sums Guaranteed Student Loan and this other loan repayment responsibility.

5 Occupational Choice - A Qualitative Variable Analysis

I begin my analysis with an approach analogous to the one taken in both the medical and legal literatures. Careers are divided into groups then conditional logits are estimated with the focus on the sign of the coefficient on educational debt. For reasons discussed in the literature review, my groupings will be closer to those for specialty choice than for sector choice. That is, one group includes careers with low initial earnings but higher earnings later.

The NPSAS records each individual's 2 digit Standard Occupational Classification (SOC) code for their first job after leaving college. I wish to classify occupations according to the shape of their age-earnings profile. To simplify, let's distinguish between only 4 types of profiles: low initial wage and low wage growth, low initial wage and high wage growth, high initial wage and low wage growth, and high initial wage and high wage growth. While it is not difficult to obtain mean wage and wage growth in the U.S. by occupation, doing so for a specific time frame and demographic would tailor the classification to the NPSAS sample. I chose the Panel Study of Income Dynamics (PSID) as a secondary data set for classification of occupations by type because the PSID records 3 digit occupation, wages, and earnings annually starting in 1968. The PSID sample is restricted to men with at least one year of college education who left school sometime between 1969 and 1983 and were present in the sample for at least 6 years. Weighted mean initial wage, 4 year wage growth, 5 year wage growth, and 6 year wage growth (as well as earnings growth) was calculated by 2 digit 1970 SOC occupation code for my sample of 1334 men.[7] The cutoff for initial wage (wage in the first year after leaving school) was $9 per hour in 1983 dollars and 15% wage growth four years hence. The categories are defined in Table 1.[8]

As argued earlier, larger educational debt leads to a higher effective borrowing interest rate which increases the incentive for front-loaded earnings profiles. So we expect a student with larger loans to have a higher conditional probability of choosing a high initial wage but low growth occupation, all else equal. Initially, I compare the choice between occupations with low initial wage-high growth and high initial wage-low growth profiles. As opposed to the other two, these wage paths have similar present discounted values of earnings. So the NPSAS sample is restricted to men in either a low initial wage-high growth or high initial wage-low growth occupation and I

[7] Each observation is weighted according to the PSID individual file core sample weight in the last (6th) year present in my sample. Implicit is the assumption that their weights adjust for non-random attrition.

[8] Classification of occupations were essentially unaffected by increasing the growth time span to 5 or 6 years - only lawyers and judges, science technologists and technicians, and clerical workers changed categories. Changing from wage to earnings cutoffs affected only one occupation.

Table 1: Occupations sorted by initial wage and wage growth

	Wage Growth	
Initial Wage	Low	High
Low	Engineering and Related Technologists and Technicians; Health Technologists and Technicians; Technicians: except health, engineering and science; Administrative Support, including Clerical; Service; Agricultural, Forestry, and Fishing; Production Working; Motor Vehicle Operators	Social, Recreation and Religious Workers; Writers, Artists, Entertainers, and Athletes; College and University Teachers; Marketing and Sales; Other Mechanics and Repairers; Handlers, Equipment Cleaners, Helpers, and Laborers; Precision and Production
High	Engineers, Surveyors, and Architects; Lawyers and Judges; Teachers: except postsecondary; Vocational and Educational Counselors; Other Health Diagnosing and Treating Practitioners; Vehicle and Mobile Equipment Repairers; Transportation and Material Moving	Executive, Administrative, and Management; Engineers, Surveyors, and Architects; Computer Scientists; Natural Scientists and Mathemeticians; Social Scientists; Physicians and Dentists; Registered Nurses; Science Technologists and Technicians; Electrical and Electronic Mechanics and Repairers; Construction and Extraction; Military

estimate

$$E[Y|Z] = \text{Prob}(Y = 1|Z) = F(\delta X)$$

where Y equals 1 if individual's first job in the year after completing schooling is in a high initial wage-low growth occupation. X is a vector of explanatory variables which includes size of debt. Intution suggests that the coefficent on debt is positive. Relevant variable definitions are found in the next section. Estimates for the Probit (i.e. $F(\cdot)$ is the cumulative distribution function of the standard normal) and Logit specifications are reported in the results section.

6 Quantitative Dependent Variable Empirical Model

The preceeding model specification was similar to those in the medical and legal literatures and provides some insight into the job decisions of college educated men. However, switching broadly defined occupations, unlike specialty or sector, is common shortly after completing schooling. Moreover, even within an occupation, individuals choose between jobs with different age-earnings profiles and the aggregation into groups may be ignoring valuable information. In this section, I present model specifications with individual wage and wage growth rather than classification according to mean wage and wage growth of the indivdiual's occupation.

I begin with a standard log linear wage regression of the form

$$\ln w_t = \sum_{j=0}^{12} \beta_j x_j + \epsilon_t, \quad E(\epsilon_t \mid x_1, \ldots, x_{12}) = 0 \tag{1}$$

where x_0 is 1, x_1 is age at time t, x_2 through x_5 are indicator variables for white, pursued a two-year degree, received a bachelor's degree, and worked at a job (other than work study) while in school, respectively, x_6 is job tenure (in years) at time t, x_7 is the national average unemployment rate at time t, $x_8 - x_{11}$ are 4 dummy variables indexing school quality and x_{12} is total educational debt which includes all loans to fund one's postseconday education but is primarily from guaranteed student loans. Models are estimated for time t, the year after finishing schooling.

Secondly, I estimate parameters in a standard wage growth model:

$$\ln w_{t+4} - \ln w_t = \gamma_0 + \gamma_1 x_1 + \ldots + \gamma_4 x_4 + \gamma_8 x_8 + \ldots + \gamma_{14} x_{14} + \varepsilon_t, \quad E(\varepsilon_t \mid x_1, \ldots, x_4, x_8, \ldots, x_{14}) = 0 \tag{2}$$

where x_{13} is job tenure at time *t+4* and x_{14} is national average unemployment rate at time *t+4*. For all of my wage growth regressions, growth is measured over a four year span: from first to fifth year after schooling.[9]

Equation 2 is the baseline growth regression. Two additional specifications are entertained. The first includes log initial wage ($\ln w_t$) as an explanatory variable thus explicitly allowing for initial

[9] Parental occupation is not included in the base wage growth regression. The link between son's and father's occupation is well established in the sociology literature; parental occupation may be correlated with son's occupation and amount of debt the son takes on to finance his college education. However, occupation switching is rampant in the first four years sons work after finishing school.

wage-wage growth trade-offs for debtors. However, debtors who chose a particularly high initial wage may have even lower wage growth. The second specification builds upon the first by replacing the debt variable (x_{12}) with two interaction terms: (1) interact loan amount with an indicator for high initial wage and (2) interact loan amount with an indicator for low initial wage. As before, the wage cutoff is \$9 per hour in 1983 dollars. We would expect the coeffient on the high wage interaction term to be negative.

Thirdly, I estimate a generalized version of the preceeding model. As before, I restrict attention to an additive model but now allow for educational debt, x_{12}, to have a nonlinear relationship with wage growth:

$$\begin{gathered} \ln w_{t+4} - \ln w_t = \textstyle\sum_{j=0}^{4} \alpha_j x_j + \sum_{k=8}^{11} \alpha_k x_k + f(x_{12}) + \alpha_{13} x_{13} + \alpha_{14} x_{14} + \zeta_t \\ E(\zeta_t \mid x_1, x_2, x_3, x_4, x_8, \ldots x_{14}) = 0 \end{gathered} \tag{3}$$

Here the form of $f(x_{12})$ is assumed unknown and I use a locally weighted regression smoother to estimate it.

My goal is to estimate the effect of educational debt on a man's wage profile early in his career. Clearly, the decision of how much to borrow to finance one's education is probably a function of individual characteristics which are determinates of the student's future wages. While I am able to control for several of these characteristics when estimating the relationship between loans, wage, and wage growth (see 1 and 2), there remain two important variables that I do not observe and are not adequately controlled for: ability and risk preference. It is likely that those who expect to earn more after finishing their schooling are willing to borrow more, will earn a higher initial wage and will experience higher wage growth. Moreover, the more of a risk taker one is, the higher the loan he will take on and, on average, the higher his wage growth (Shaw(1996)). I discuss these possible sources of bias in my estimates of the relationship between debt size, wage, and wage growth in the results section of the paper. That said, the comparable literature is also unable to account for these factors.

Below I describe the construction of the variables where definitions are unclear or where modelling is nonstandard.

6.1 Hourly Wage

The NPSAS asks former students to report their starting and ending weekly earnings, hours, and year for each of the last 10 jobs worked. In many cases, one of those jobs began the year after schooling and hourly wage is directly observed. In cases where the year after schooling fell between a start and end year of a job, hourly wage at time t was computed by linear interpolation.

$$w_t = \frac{\left(\frac{yfs}{yfs+yfe}\right) * y_e + \left(\frac{yfe}{yfs+yfe}\right) * y_s}{hrs} \tag{4}$$

where yfs is years from starting the job, yfe is years from ending the job, y_e is weekly earnings at end of job, y_s is weekly earnings at start of job, and hrs is average weekly hours worked at job.

6.2 School Quality

Most people believe that better college education both costs more money and leads to higher-paying jobs. Testing the latter relationship, Solmon and Wachtel (1975) find statistically significant differences in the predicted earnings of graduates from various types of college (using a classification scheme developed by the Carnegie Commission on Higher Education). Because school quality is also correlated with educational debt, I include a measure of postsecondary school quality in my estimation. I define four indicator variables for school quartile rank 1 through 4 as reported in U.S. News and World Report's 1990 college rankings.

Men in my sample finished their schooling between 1976 and 1983. Few measures of the quality of undergraduate education existed during this time period and those that did were heavily criticized.[10] Glenn (2000) provides an excellent summary of the problems with these ranking systems. Caveats in mind, the U.S. News and World Report's annual college rankings are probably the most famous and extensive.

The U.S. News and World Report began ranking colleges in 1983. Initially, the rankings were based solely on the opinions of surveyed college presidents and ranked fewer than 100 schools. Then in 1988, the rankings were modified to include objective data (e.g. median SAT scores and percentage of professors with doctorates). Then in 1990, the ranking was expanded from the top 25 by category to the top 345 national universities and liberal arts colleges by quartile. Given the scope of the 1990 ranking and the high persistence of ranking, I settled on indicator variables for these quartiles as my measure of school quality.

Because only 27 out of 1,061 students in my sample attended a ranked liberal arts college and quality of education is fairly constant across type, I combined the rankings of national universities and liberal arts colleges. For example, q_1 is defined to equal one if the student attended one of the top 51 ranked national universities or one of the top 36 ranked liberal arts colleges in 1990 and zero otherwise. Figure 2 shows the quality distribution of postsecondary institutions attended by the men in my sample. As expected, mean educational debt in my sample rises with school quality.

As can be seen in Figure 2, sixty-five percent of students in my sample attended a school which was not ranked - mostly other universities, but some community colleges and specialty schools. For example, less than one percent of those pursuing a two-year degree attended a ranked school. While it is unclear that variation in school quality within this group of schools would substantially help explain wages, this fact does suggest an alternative approach to controlling for school quality: a fixed effects model. Unfortunately, only a small percentage of schools represented have more than one student attending so the fixed effects approach is not viable.

[10] David Webster summarizes existing measures in his November 1986 article in Change.

7 Results

7.1 Occupational Choice

The first estimates are for occupational choice regressions. A college educated man's initial career choice is categorized by type of wage profile. The dichotomous dependent variable regressions compare selection probabilities of high initial wage-low growth occupations to low initial wage-high growth occupations. Observations for men who did not report their occupation, or who worked in either a low initial wage-low wage growth occupation or a high initial wage-high wage growth occupation were dropped.

Maximum likelihood coefficient estimates for both specifications are reported in Table 2. The positive, statistically significant, coefficients on total educational debt imply that the predicted probabililty of choosing a front loaded profile increases with debt. This is consistent with our story. The excluded category for school quality is an unranked school so the positive coefficients on the ranked school quality variables suggests that men who attend higher ranked schools, independent of how large their loans are, are also more likely to choose high initial wage and low growth profiles. Several explanations could be consistent with these findings. One troublesome explanation is that, on average, the high initial wage-low wage growth occupations have higher expected lifetime wages than the low initial wage-high wage growth profiles.

Over 30% of sons in my sample switched two digit (SOC) occupation by their fifth year out of school. In fact, except for registered nurses, physicians and dentists, lawyers and judges, engineers and surveyors, vehicles repairers, and construction workers, each 2 digit occupation had a minimum of 1 in 5 sons switch. This occupational switching provides yet more motivation to focus on job, rather than occupational, characteristics when estimating the effect of debt.

7.2 Job Choice and Wages

I begin this analysis by estimating the log linear wage and wage growth equations using the full sample, after dropping observations for men who were unemployed that year. This exclusion reduced my sample size from 1006 to 922. In the wage growth regression, I further excluded men who were unemployed in the fifth year post schooling, this reduced the sample size to 880. Table 3 shows the coefficient estimates and their standard errors for the two regressions. For all model specifications, the baseline group is men who attended a four-year, unranked college but did not receive a degree.

Most coefficient estimates in Table 3 have the expected sign. Focusing on column one, we see that estimated log wage is higher for those who are older, white, have a bachelors degree, worked while in school, worked at current job longer, attended a higher quality college, and went to work in an economy with low unemployment. Contrary to expectation, there is an estimated positive (but insignificant) coefficient on attending a two year (rather than four year) college and an estimated negative (but insignificant) coefficient on receiving a diploma. The second column of Table 3 shows

Table 2: Logit and Probit Estimates of Occupational Choice

	Dependent variable = 1 if high initial wage low wage growth occupation	
Variable	Logit(MLE)	Probit(MLE)
Age	0.018 (0.037)	0.010 (0.022)
White	0.330 (0.398)	0.179 (0.236)
Two Year College	0.224 (0.439)	0.120 (0.264)
Diploma	0.688* (0.307)	0.422* (0.182)
Bachelor Degree	1.006** (0.343)	0.614** (0.205)
Total Educ Debt (000's)	0.128** (0.030)	0.076** (0.017)
School Ranked in Top Quartile	1.018** (0.391)	0.634** (0.236)
School Ranked in 2nd Quartile	0.470 (0.342)	0.297 (0.208)
School Ranked in 3rd Quartile	1.170* (0.512)	0.727* (0.310)
School Ranked in 4th Quartile	0.090 (0.452)	0.061 (0.276)
US Unemp Rate in 1st Year Post Schooling	-0.052 (0.074)	-0.033 (0.044)
Father's Educ (HS or GED)	0.173 (0.374)	0.105 (0.227)
Father's Educ (some 2 college, no degree)	-0.327 (0.408)	-0.201 (0.246)
Father's Educ (4 or 5 year college degree)	-0.306 (0.442)	-0.187 (0.268)
Father's Educ (grad education)	-0.054 (0.473)	-0.045 (0.287)
Constant	-2.261 (1.230)	-1.318 (0.727)
N	374	374
Log Likelihood	-221.247	-221.070

Standard errors are in parentheses. A * indicates that the estimate is significantly different from zero at a five percent level and ** indicates significance at a one percent level.

the results for the wage growth regression. As expected, estimated growth is higher for those who are white, attend graduate school, receive a degree, and have been at their current job longer. The estimated coefficients on the school quality variables are jointly insignificant at the five percent level.

For the most part, estimated coefficients in Table 3 have predictable magnitudes as well. For example, similar to Loprest(1992), whites have an estimated 5.9 percent higher wage growth. Secondly, those who attend the highest quality college have an estimated 16 percent higher wage. Given my more exclusive definition of highest quality, the 18 percent "return" to attending the highest quality college is roughly comparable to Solomon and Watchel's estimated 8 percent.[11]

According to regression results in Table 3, an additional thousand dollars of educational debt produces about a one percent increase in the wage of job one year out of school and two tenths of a percent wage growth over the next four years. The first estimate is significant at the five percent level while the second is not. There are three caveats for interpretation of these estimates. First, unemployed men were excluded and there may be a negative relationship between debt and unemployment. Second, these models may not have adequately controlled for graduate school attendance which could be postively correlated with wages, wage growth and debt. Thirdly, these estimates constrain debt to have a linear additive effect on wage and wage growth, while studies of medical school debt have found a nonlinear relationship.

In order to examine the first two possible causes for bias in the effect of educational debt, I estimate two probit regressions. The dependent variable in the first model is an indicator variable for whether the former student was unemployed his first year post schooling. Factors that might affect his employment status include his age, race, education, previous work experience, and debt. As shown in Table 4, my results suggest that men with larger debt are less likely to be unemployed in the year after finishing school. Moreover, those who are unemployed in the first period have higher than average growth. Thus by dropping the unemployed I may be underestimating wage growth for those with lower debt.

The second column of Table 4 shows the probit regression results for attending graduate school. My estimates are roughly consistent with those in Schapiro, O'Malley, and Litten(1991). Men who attend higher quality colleges as well as those who have larger debt are more likely to attend graduate school. Debt may affect graduate school attendance for two reasons: some Guaranteed Student Loans waive interest payments while in school and willingness to take on debt may be associated with a relatively high valuation of education. If we are willing to restrict attention to models which treat educational decisions as exogenous but job decisions as endogenous, we need to adequately control for graduate school attendance when estimating the effect of educational debt. Moreover, the increased educational debt, changing asset holdings between time of loan and post schooling, and a lack of information about work experience in the interim, creates substantial problems in effectively estimating the effect of debt burden for those who go on to graduate school.

An alternative approach to estimating the effect of debt on wage and wage growth, is to estimate

[11] I compare my coefficient estimate for attending a college or university ranked in the top 25 to estimates in Solomon and Watchel (1975) Table 3 regression results which do not condition on IQ score.

Table 3: Coefficient Estimates in Linear Regressions

	Dependent Variable	
Variable	log wage in 1st year post schooling	log wage in 5th year - log wage in 1st year
Constant	1.443* (0.165)	0.808* (0.139)
Age	0.022* (0.005)	-0.014* (0.005)
White	0.059 (0.047)	0.049 (0.039)
Two Year College	0.010 (0.052)	-0.070 (0.044)
Diploma	-0.025 (0.040)	0.071* (0.034)
Bachelor Degree	0.180* (0.045)	0.081* (0.038)
Grad School	0.089 (0.050)	0.080 (0.041)
Worked While in Postsecondary School	0.032 (0.034)	
Tenure at 1st Job Post Schooling	0.049* (0.013)	
Tenure at Job Working 5 Years Post Schooling		0.014* (0.006)
Total Educ Debt (1,000's)	0.007* (0.003)	0.002 (0.003)
School Ranked in Top Quartile	0.182* (0.059)	-0.076 (0.048)
School Ranked in 2nd Quartile	0.116* (0.053)	-0.015 (0.044)
School Ranked in 3rd Quartile	0.065 (0.068)	-0.076 (0.056)
School Ranked in 4th Quartile	-0.010 (0.069)	0.044 (0.059)
US Unemp Rate in 1st Year Post Schooling	-0.032* (0.010)	
US Unemp Rate in 5th Year Post Schooling		-0.061* (0.012)
N	922	880
R^2	.190	.068

Standard errors are in parentheses. A * indicates that the estimate is significantly different from zero at a five percent level.

Table 4: Coefficient Estimates in Probit Regressions: Full Sample

	Dependent Variable	
Variable	unemployment in 1st year post schooling	attending graduate school
Constant	-3.879* (0.558)	-1.392* (0.144)
Age	0.090* (0.02)	
White	-0.139 (0.179)	-0.153 (0.131)
Two Year College	0.021 (0.217)	
Diploma	0.128 (0.164)	
Bachelor Degree	-0.359 (0.194)	
Grad School	0.266 (0.194)	
Worked While in Postsecondary School	0.291 (0.153)	-0.076 (0.096)
Total Educ Debt (1,000's)	-0.044 (0.023)	0.136* (0.012)
School Ranked in 1st Quartile	0.364 (0.228)	0.834* (0.144)
School Ranked in 2nd Quartile	-0.08 (0.251)	0.588* (0.133)
School Ranked in 3rd Quartile	0.512* (0.242)	0.442* (0.171)
School Ranked in 4th Quartile	0.298 (0.269)	0.356* (0.181)
N	1061	1061
Log Likelihood	-196.7	-497.1

Standard errors are in parentheses. A * indicates that the estimate is significantly different from zero at a five percent level.

the effect for only a specific group: men who do not go on to graduate school. Columns 1 and 2 of Table 7 are analogous to columns 1 and 2 of Table 3 in that they report linear regression results for initial wage and wage growth but restrict the sample to men without graduate educations. This changes the sign of only the coefficient estimate on debt in the wage growth regression (from positive to negative). In both samples, this estimate is not statistically different from zero at the five percent level. The magnitude of the effect of educational debt on initial wage has increased from 0.007 to 0.016.

According to results in Table 7, higher educational debt is associated with higher initial wages the year after finishing school and lower wage growth over the next four years. Still, debt could have no direct relationship with growth. Wage growth is measured by change in log wage. Particularly if an individual switches jobs over this period, a high initial age could result in lower growth, independent of debt.

Table 6 reports results from the set of wage growth regressions which include log initial wage. The coefficient on debt is now small, positive, and insignificant in the first specification (column 1 of Table 6) suggesting that, at a given initial wage, debt is essentially unrelated to wage growth. However, if we distinguish between high and low initial wage, predicted growth declines with debt level (see column 2).

So far, I constrained a dollar increase in debt to have the same effect on wage and wage growth independent of the level of debt. However, it is possible that increases in debt have a larger impact if debt is already high. One way to model this is to construct explanatory variables that distinguish between debt amounts above and below a dollar cutoff value. I define GSL1 to be zero if Guaranteed Student Loan debt is above 10 thousand dollars and equal to the dollar amount in thousands otherwise. I define GSL2 to be zero if Guaranteed Student Loan debt is below 10 thousand dollars and equal to the dollar amount in thousands otherwise. The regression estimates for the new wage growth model specification are reported in column three of Table 3. According to coefficient estimates on GSL1 and GSL2, a dollar increase in debt when debt is below $10,000 has a positive impact on wage growth while that same dollar increase when debt level is high results in a decrease in wage growth. That said, neither coefficient estimate is statistically significant at the five percent level.

Obviously, the $10,000 cutoff value was arbitrary. Semiparametric estimators offer a convenient alternative to model specifications which impose linearity and employ explanatory variables which interact a dummy and the continuous variable. The new model is given by Equation 3. I assume a linear form for all explanatory variables in the model except for educational debt which enters in nonparametrically. For the estimation of the effect of debt on wage growth, I use a locally linear regression smoother. Estimates of the linear terms are shown in Table 4. These coefficient estimates are almost indistinguishable from those in the fully linear model (column 2 of Table 7). Figure 3 displays the conditional prediction of the effect of educational debt on wage growth, $\hat{f}(x_{12})$. Notice that this curve is approximately linear for debt levels of about $7,000 and up. Figure 4 displays the same estimated curve but includes 95% confidence intervals (the dashed lines).

Table 5: Coefficient Estimates in Linear Regressions: Only men with at most a college education

	Dependent Variable		
Variable	log wage in 1st year post schooling	log wage in 5th year - log wage in 1st year	log wage in 5th year - log wage in 1st year
Constant	1.468* (0.185)	0.815* (0.156)	0.697* (0.153)
Age	0.024* (0.006)	-0.013* (0.005)	-0.010* (0.005)
White	0.049 (0.053)	0.073* (0.045)	0.086 (0.045)
Two Year College	0.010 (0.051)	-0.064 (0.043)	-0.037 (0.042)
Diploma	-0.004 (.042)	0.063 (.036)	
Bachelor Degree	0.174* (0.047)	0.091* (0.039)	0.078* (0.038)
Worked While in Postsecondary School	0.038 (0.042)	0.026 (0.032)	
Tenure at 1st Job	0.047* (0.015)		
Tenure at Job Working 5 Years Post Schooling		0.019* (0.007)	0.019* (0.007)
Total Educ Debt (1,000's)	0.016* (0.006)	-0.002 (0.005)	
GSL1			0.008 (0.008)
GSL2			-0.008 (0.007)
School Ranked in Top Quartile	0.182* (0.078)	-0.051 (0.063)	-0.051 (0.063)
School Ranked in 2nd Quartile	0.114 (0.064)	-0.031 (0.053)	-0.035 (0.052)
School Ranked in 3rd Quartile	0.058 (0.079)	-0.061 (0.065)	-0.077 (0.065)
School Ranked in 4th Quartile	-0.013 (0.080)	0.035 (0.068)	0.014 (0.067)
US Unemp Rate in 1st Year Post Schooling	-0.042* (0.011)		
US Unemp Rate in 5th Year Post Schooling		-0.071* (0.012)	-0.064* (0.012)
N	709	673	692
R^2	0.140	0.084	0.0753

Standard errors are in parentheses. A * indicates that the estimate is significantly different from zero at a five percent level.

Table 6: Coefficient Estimates in Linear Wage Growth Regressions: initial wage included

	Dependent Variable		
Variable	log wage in 5th year - log wage in 1st year		
Constant	0.983**	0.822**	0.903**
	(0.147)	(0.153)	(0.152)
Age	-0.006	-0.006	-0.003
	(0.005)	(0.005)	(0.005)
White	0.081	0.080	0.062
	(0.043)	(0.042)	(0.044)
Two Year College	-0.062	-0.053	-0.050
	(0.041)	(0.041)	(0.041)
Diploma	0.053	0.046	0.051
	(0.034)	(0.034)	(0.034)
Bachelor Degree	0.134**	0.136**	0.122**
	(0.038)	(0.037)	(0.037)
Tenure	0.025**	0.027**	0.022**
	(0.006)	(0.006)	(0.006)
Total Educ Debt (1,000's)	0.002		
	(0.005)		
Educ Debt if No Parental Transfers in College			-0.002
			(0.004)
Educ Debt if Initial Wage is Less than $9/hour		0.011*	
		(0.006)	
Educ Debt if Initial Wage is More than $9/hour		-0.012	
		(0.006)	
Log Wage 1st Year Post-Schooling	-0.264**	-0.202**	-0.258**
	(0.030)	(0.035)	(0.030)
School Ranked in Top Quartile	-0.005	0.008	-0.011
	(0.060)	(0.060)	(0.060)
School Ranked in Second Quartile	0.002	0.011	-0.002
	(0.050)	(0.050)	(0.049)
School Ranked in Third Quartile	-0.058	-0.053	-0.065
	(0.062)	(0.061)	(0.061)
School Ranked in Fourth Quartile	0.030	0.048	0.017
	(0.064)	(0.064)	(0.063)
US Unemp Rate in 1st Year Post-Schooling	-0.051**	-0.049**	-0.050**
	(0.012)	(0.012)	(0.012)
Father's Educ (HS or GED)			-0.008
			(0.043)
Father's Educ (some college, no degree)			0.098*
			(0.049)
Father's Educ (4 or 5 year college degree)			0.049
			(0.051)
Father's Educ (grad educ)	20		0.046
			(0.061)
N			
R^2	.1778	.1920	.1824

Standard errors in parentheses. A * indicates that the estimate is significantly different from zero at

Table 7: Coefficient Estimates in Semi-Parametric Regression: Only men with at most a college education

Variable	log wage in 5th year - log wage in 1st year
Constant	0.725
Age	-0.010
White	0.090
Two Year	-0.037
Bachelor Degree	0.081
Tenure at Job 5 Years Post Schooling	0.018
School Ranked in Top Quartile	-0.051
School Ranked in 2nd Quartile	-0.036
School Ranked in 3rd Quartile	-0.068
School Ranked in 4th Quartile	0.012
US Unemp Rate 5 Years Post Schooling	-0.066
Total Educ Debt (1,000's)	****
N	691
Null Deviance	111.427
Residual Deviance	103.0741

****'s on GSL indicate that there is not a constant coefficient (see Figure 3).

8 Bias

As I discussed earlier, excluding the unemployed may be upwardly biasing my coefficient on educational debt in the wage growth regressions. Another potential source of bias may result from the interplay between debt, wage growth, and unobserved ability. Throughout, debt has been treated as an exogeneous variable. However, it is possible that those with higher scholastic ability may be more willing to take on debt to fund their college education and also earn higher wages and experience greater wage growth. Omitting the ability variable leads again to an upward bias in the coefficient on educational debt. Therefore, my estimate might be considered an upward bound on the true effect of educational debt on wage growth.

9 Concluding Remarks

Ultimately, I would like to estimate the impact of educational debt on job decisions early in one's career. In this paper, I rationalize and quantify the relationship between individual initial wage, four-year wage growth, and debt from financing one's own college education, controlling for factors such as race, job tenure, and school quality. I interpret the cause of the observed positive relationship between initial wage and debt, and negative relationship between wage growth and debt as borrowing constraints placed on the young worker. My interpretation relies upon several strong assumptions: 1) debt is exogenous (in particular, debt is unrelated to ability), 2) there is sufficient variation in offered wage profiles for this to be the result of a choice, and 3) preferences over career paths are not influenced by parental income. In future versions of this paper, I would like to relax the first assumption, empirically justify the second, and test the third. To the extent that researchers have not found strong support for debt affecting educational attainment and the fact that those in my sample attended some college and were in need of financial assistance from the government to fund their education, the resulting estimate is perhaps ameliorated.

Appendix Table 1: Means and Standard Deviations

Variable Definition	Symbol	Mean	Std Dev.
Variables in Regressions			
Average weekly earnings the year after finishing school	earnyr1	369.78	252.46
Average weekly earnings five years after finishing school	earnyr5	478.24	252.46
Average hours per week the year after finishing school	hrsyr1	41.31	13.20
Average hours per week five years after finishing school	hrsyr5	42.24	13.96
Age the year after finishing school	age	25.2	3.59
Indicator equal to 1 if reported race/ethnicity as non-Hispanic white	white	0.86	0.35
Indicator equal to 1 if pursuing a two-year college degree	twoyr	0.18	0.39
Indicator equal to 1 if attended graduate school	gradsch	0.24	0.43
Indicator equal to 1 if received a bachelors degree	bachdeg	0.58	0.49
Indicator equal to 1 if received a college diploma	diploma	0.32	0.47
Indicator equal to 1 if had work experience other than work study while in postsecondary school	schwexp	0.65	0.48
Tenure at job working in year after finishing school	tenure1	0.92	1.26
Tenure at job working five years after finishing school	tenure5	3.07	2.26
Indicator variable equal to 1 if attended a school ranked in top quartile	q1	0.10	0.30
Indicator variable equal to 1 if attended a school ranked in second quartile	q2	0.11	0.32
Indicator variable equal to 1 if attended a school ranked in third quartile	q3	0.07	0.25
Indicator variable equal to 1 if attended a school ranked in fourth quartile	q4	0.06	0.24
Total dollar value of Guaranteed Student Loans (GSL) the year after finishing school	gsl	4,909	4,138
Total dollar value of educational debt the year after finishing school	loan	4,927	4,178
National average annual unemployment rate for men in the year after finishing school	ur1	8.06	1.63
National average annual unemployment rate for men in the year after finishing school	ur5	6.79	1.27
Father's education (high school or GED)	fed1	.34	.47
Father's education (some college, no degree)	fed2	.19	.39
Father's education (4 or 5 year college degree)	fed3	.18	.39
Father's education (graduate school)	fed4	.11	.32
Educational debt if no parental transfers in college	noptrans	2,540	4,470
Educational debt if initial wage is less than $9 per hour	intlw1	2,410	4,930
Educational debt if initial wage is more than $9 per hour	inthw1	3,100	4,820

References

[1] 'Best of the Best' (Oct. 15, 1990). *U.S. News and World Report*, pp. 121-122.

[2] 'Best of the Rest' (Oct. 15, 1990). *U.S. News and World Report*, pp. 124-127.

[3] Cameron, S. and J. Heckman (1998). 'Life Cycle Schooling and Educational Selectivity: Models and Choice,' *Journal of Political Economy*, **106**262-333.

[4] Cameron, S. and C. Taber (2001). 'Estimation of Educational Borrowing Constraints using Returns to Schooling,' mimeo, Northwestern University.

[5] Colquitt, W., Zeh, M., Killian, C. and J. Cultice (1996). 'Effect of debt on U.S. medical school graduates' preferences for family medicine, general internal medicine, and general practitioners', *Academic Medicine*, **71(4)**399-411.

[6] Flyer, F.A. (1997). 'The Influence of Higher Moments of Earnings Distributions on Career Decisions', *Journal of Labor Economics*, **15(4)**689-713.

[7] Keane, M. and K. Wolpin (2001). 'The Effect of Parental Transfers and Borrowing Constraints on Educational Attainment', *International Economic Review*, **42(4)**1051-1103.

[8] Kersten, G. (2000). *Grading on the Curve: College Ratings and Rankings. Points of Reference.*

[9] Orazem, P.F. and J.P Mattila (1991). 'Human Capital, Uncertain Wage Distributions, and Occupational and Educational Choices', *International Economic Review*, **32(1)**103-122.

[10] Rosenthal, M., Marquette, P., and J. Diamond (1996). 'Trends along the debt-income axis: implications for medical students' selections of family practice careers', *Academic Medicine*, **71(6)**675-677.

[11] Sauer, R. (1998) 'Job mobility and the market for lawyers', *Journal of Political Economy*, **106(1)**147-171.

[12] Schapiro, M.O., O'Malley, M.P., and L.H. Litten (1991). 'Progression to Graduate School from the "Elite" Colleges and Universities', *Economics of Education Review*, **10(3)**227-244.

[13] Shaw, Kathryn (1996) 'An Empirical Analysis of Risk Aversion and Income Growth', *Journal of Labor Economics*, **14(4)**626-653.

[14] Solmon, L.C. and P. Wachtel (1975). 'The Effects on Income of Type of College Attended', *Sociology of Education*, **48(1)**75-90.

[15] Solorzano, L. and B. Quick (1983) 'Rating the Colleges', *U.S. News and World Report*, **Nov. 28**41-48.

[16] Webster, D. (1986). 'Ranking Academic Quality: The Undergrad Story', *Change*, Nov. 34-38.

[17] Woodworth, P., Chang, F., and S. Helmer (2000). 'Debt and other influences on career choices among surgical and primary care residents in a community-based hospital system', *American Journal of Surgery*, **180(6)**570-576.