The Effects of Graduate–Student Unionization on Stipends*

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Abstract

Graduate–assistants (GAs) have been facing increasing responsibilities as teachers, researchers, and students. At the same time, they are also taking longer to complete their Ph.D.'s. A potential response to this has been the rise of graduate–student unions. There has been some discussion of whether economic motives will interfere with the student's education. Surprisingly, little is known about the impact unionization has on stipends. Consequently, scholarly debate has been only able to guess what its impact is, if any. The goal of this study is to statistically analyze the impact of unionization on stipends by using a survey published by the *Chronicle of Higher Education* in 2001. Specifically, this paper answers two questions: (1) does unionization increase graduate assistant stipends and (2) does the extent of unionization contribute to wage increases? This study concludes that unionization does not impact stipend amounts.

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1 Introduction

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Labor unionization movements have traditionally been the subject of a large amount of empirical research. However, while overall union memberships have declined in the United States, the number of graduate–student unions have increased. Surprisingly, little research on graduate–student unions has been published. This is mostly attributable to little availability of stipend data. However, a new survey by *The Chronicle of Higher Education* provides stipend information which allows a thorough statistical investigation of unionization. Likewise, when the data is combined with other available data, then an analysis can isolate the effects of unionization. This study reports the impact of unionization on stipends while controlling for other variables.

Graduate–student unions are interesting and unique in a number of aspects. First, the profile of a graduate–student does not fit the profile of a typical union member. Where union members have been employed for quite some time, graduate students are typically employed for a few years. Second, the function of graduate assistants (GAs) closely resembles the work of university faculty insofar as both GAs and faculty are expected to teach and to be published. The similarities are useful because a number of university faculty members unionized in the 1970s and 1980s. Thus, studies regarding faculty unionization can provide a few expectations for investigating graduate–student unionization.

Lastly, the purpose of GAs and the need for student unions is currently being contested. There are several convincing studies showing graduate students are needing to meet higher expectations as teaching and research assistants. For instance, the American Association of University Professors [1995] reported that faculty members who are also graduate students has increased 35 percent since 1975. Similarly, graduate students report an increase in the amount of time dedicated per week to teaching and research [Ehrenberg and Mavros, 1995]. Correspondingly, the amount of time to complete a Ph.D. has risen since 1970 [Ehrenberg, Klaff, Kezsbom, and Nagowski, 2004]. The increased load as a graduate assistant in addition to increased time as a Ph.D. candidate suggests unionization seeks to increase remunerations to offset the higher costs as a Ph.D. student. Thus, the apparent economic motive has concerned some that graduate students will try to promote monetary gain instead of experience [Barba, 1994]. In the current debate, many arguments presuppose that unions will actually increase wages [Aronowitz, 1998]; however, the ability for unions to increase wages is disputable.

Of the little empirical research that has been conducted on graduate–student unions, it appears that nonunion graduate assistant's stipends increase more, on average, than a unionized graduate assistant [Ehrenberg et al., 2004]. The results are not definitive, however, since details of the data set could not be disclosed, which limited the amount of control for outlying variables (e.g. disciplines, institution type).

Likewise, the ability for a graduate–student union to increase stipends is also mollified by related literature in faculty unions. During the 1970s, a similar unionization movement started amongst faculty members at public universities.[1] Unlike the study of GA unions, greater availability of faculty wage data permitted many empirical studies to be published. A number of studies found that faculty wages grew marginally [Birnbaum, 1976, Morgan and Kearney, Leslie and Hu, 1977, Freeman, 1978, Barbezat, 1989] or not at all [Marshall, 1979, Guthrie-Morse, Leslie, and Hu, 1981] compared to nonunion faculty members. Thus, it should not be assumed that graduate–student unions will lead to increases in stipends.

[1] After a ruling by the United State Supreme Court, faculty members at private institutions were prohibited from collectively bargaining (*NLRB v. Yeshiva University* 944 U.S. 672 [1980]).

The implicit aim of this study is to rectify the concerns of unionization with the realities. That is, does unionization increase stipends for graduate students? If not, should there still be any concern of whether economic motives will interfere with the education of graduate students? Furthermore, if unionization does not increase stipends, what really is the motive for unionization? Thus, the explicit purpose of this study is to use statistical regressions to estimate the impact unionization has on stipends, if any. Specifically, this study answers two questions: (1) does unionization increase graduate assistant (GA) stipends and (2) does the extent of unionization contribute to wage increases?

The next section reviews the components of the data set; section 3 summarizes the results; brief qualifications are made in section 4; and section 5 concludes.

2 Data Set

The data set for this study is composed of a survey published by *The Chronicle of Higher Education* [Smallwood, 2001a] and data available from the Coalition of Graduate Employee Unions (CGEU). The pith of the data set is the Smallwood [2001a] study since it pairs stipends with the student's institution, major, and health–care coverage. Additional data from the CGEU provides information regarding union status and year organized. The combination of data from Smallwood [2001a] and the CGEU allows the author to estimate the effects of unionization while controlling for various exogenous factors.

In 2001, *The Chronicle of Higher Education* sent a survey to all 61 members of the Association of American Universities and received responses from 45 universities—some survey's were only partially completed. The survey asked the universities what they paid GAs in biology, economics, English, and mechanical engineering for the 2001–2002 academic year. Some of the stipend information was provided as of the 2000–2001 academic year, which has adjusted for inflation for Aug. '01/Aug. '02 using the CPI–Urban Index. In addition, the survey asked two binary questions: (1) do universities cover 75% or more of the student's health–care premiums and (2) do universities cover 50% or more of the the students' spouse's and/or dependent's health–care premiums? Many, but not all, universities answered the latter health–care question.

There is some expectation that students with different majors will receive different stipend amounts. To control for any inherent differences, the student's major is denoted by BIOLOGY, ECONOMICS, ENGLISH, and MECHANICAL ENGINEERING. Each major is nearly equally represented in the data: ENGLISH 39 observations (25.16%), ECONOMICS 44 observations (24.52%), BIOLOGY 38 observations (24.52%), and MECHANICAL ENGINEERING 34 observations (22%). Additionally, students are paid over either a 9-month period of over a calendar year. ANNUAL is a dummy variable that denotes that the student is paid over a calendar year.

STUDENT is a dummy variable denoting an affirmative response to the former health–care question—do universities cover 75% or more of the student's health–care premiums? A vast majority of the observations, 144 observations (73.55%), indicated that they do cover at least 75% of the student's health–care costs. Similarly, SPOUSE is a dummy variable denoting an affirmative answer to the latter health–care question—do universities cover 50% or more of the the students' spouse's and/or dependent's health–care premiums? Fifteen universities did not answer this question, however, of the 140 that did respond, 35 (25%) of the observations do cover at least half of the spouse's and/or dependents health–care premiums.

It is important to keep in mind that the ability to effectively bargain depends *inter alia* with the extent of unionization [Lewis, 1986, chap. 7]. To control for the extent of unionization in this study union status has

been divided into two dichotomous groups: unions with collective bargaining power (UCOV) and those just with union memberships (UMEM).[2] Unions with collective bargaining power are officially recognized unions that are allowed to collectively bargain or, if permitted by state law, to even strike.[3] On the other hand, membership–unions maintain a union presence, but are not recognized by the university as a collective–bargaining agent. One may expect a tentative and menacing ability to demur contract negotiations or to strike should increase the effectiveness to raise stipends. It is not clear, however, if a union presence can effectively increase stipends. In this survey, 81 universities (52.26%) are unionized, of which, 50 (32.26%) are UCOV and 31 (20%) are UMEM.

It is worth noting that the ability to unionize, to collectively bargaining, or to strike differs by the institution type. Public universities are state institutions, thereby the ability to unionize is governed by state law. Private universities, on the other hand, are private–nonprofit institutions and labor relations are controlled by the National Labor Relations Board (NLRB). Private universities were allowed to unionize in 2000, overturning precedence set in the 1970's. This was overturned again in 2004 by the NLRB, leaving private universities unable to unionize.[4]

In addition to extent of unionization, the length of organization (YRSORG) may influence stipend amounts. Empirical literature suggests one of two effects may be evident. Unions may experience a "cohort effect," indicated by a positive coefficient, where older unions become more experienced and effective at raising stipends (e.g. Barbezat [1989], Freeman [1978]). Otherwise, unions may experience a "time effect," a negative coefficient, where the impact of unions decreases over time.[5] The length of unionization (YRSORG) is calculated by subtracting the year the university organized from 2001—the surveyed year. For the University of Michigan, which unionized in 2001, YRSORG is zero. University of Wisconsin, the first campus to organize, has a value of thirty–two.

Furthermore, there is evidence that a wage disparity may exist between public and private institutions in the same economic sector, including those in secondary education [see Moore and Rarisian, 1987]. One reason for a great variation is the differences in tuition. Private universities traditionally have higher tuition rates than public institutions. Consequently, private schools may compensate with greater tuition reimbursement instead of higher stipends. To control for this a dummy variable (PUBLIC) is used to differentiate between public and private universities. Ninety-nine (63.87%) observations are public universities,[6] of which, 69 (69.69%) are unionized in some form.

Lastly, cost–of–living differences are likely to influence stipend amounts. Thus, universities have been categorized into one of four regions used by the U.S. Census Bureau: west, midwest, northeast, and south. WEST is between the Pacific Ocean and the Rocky Mountains; MIDWEST is bounded by Nebraska and Ohio on the sides and Missouri to the south; NORTHEAST is outlined by the Mason–Dixon line and Ohio; and the SOUTH is below the Mason–Dixon line and bounded by Texas and Oklahoma on the west. Each of the

[2]It is particularly important to note that union status, and only union status, is provided by the CGEU. As previously mentioned, stipend information is provided by Smallwood [2001a], whereas union information (e.g. union status) is provided by the CGEU so not to be froward to any group.

[3]In this study, individuals covered by collective bargaining agreements are also union members. Some literature has pointed out there tends to be wage gaps between "covered–union" and "covered–nonunion," but it does not apply here. See, for example, Jones [1982], Budd and Na [2000].

[4]Unfortunately, the scope of this paper cannot look at this deeper, but is documented by other sources [Smallwood, 2001b, Arenson and Greenhouse, 2004].

[5]Also see Hirsch and Addison [1986].

[6]University of Pittsburgh is sometimes referred to as semi-public. For this survey it was categorized as a public university.

four regions are fairly represented: SOUTH 33 observations (21.29%), NORTHEAST 39 observations (25.16%), MIDWEST 43 observations (27.74%), and WEST 40 observations (25.81%).

In summary, the above text outlines thirteen dummy variables and one explanatory variable. The dummy variables are UCOV, UMEM, BIOLOGY, ECONOMICS, ENGLISH, MECHANICAL ENGINEERING, ANNUAL, STUDENT, SPOUSE, WEST, MIDWEST, NORTHEAST, SOUTH, and PUBLIC. YRSORG, the variable denoting the length of organization, is the only continuous explanatory variable.

Table 1 outlines some descriptive statistics of each variable. Most notably, the mean stipend for unionized campuses is $795 lower than nonunion campuses. Correspondingly, in the sample for unionized campuses, public universities compose a large share of the sample. This turns out to be an augury of the disadvantages of nominal stipends at a public university.

3 Regression Equation and Estimates

3.1 Regression Equation

Equation (1) estimates the effects of unionization on stipends.

$$\begin{aligned}\ln(W) = \alpha + \beta_1 \text{UCOV} + \beta_2 \text{UMEM} + \beta_3 \text{YRSORG} + \beta_3 \text{ANNUAL} + \vec{\beta}_4 \text{MAJOR} \\ + \beta_5 \text{PUBLIC} + \vec{\beta}_6 \text{REGION} + \beta_7 \text{STUDENT} + \beta_8 \text{SPOUSE} + \epsilon \end{aligned} \tag{1}$$

Where W is the stipend paid in dollars, α is the intercept, ϵ is the error term, and is controlled by β_j coefficients. To save notation, I have compacted BIOLOGY, ECONOMICS, and ENGLISH (MECHANICAL ENGINEERING is omitted) variables to a vector denoted as MAJOR. Likewise, REGION is a vector containing NORTHEAST, MIDWEST, and WEST (SOUTH is excluded).

The raw data set contains 155 observations; since a number of universities did not respond to a students' spouse's/dependent's health–care question (denoted by SPOUSE), the number is reduced to 140 observations in the "full" regression. Table 2 summarizes the results from equation (1).

3.2 Estimated Coefficients

At the outset of the regression it is unclear which variables will be statistically significant for this model. However, to eliminate spurious variables, a handful of regressions were created. Table 2 lists three models. Model 1 is the "full" regression that includes all of the variables from equation (1). Model 2 excludes statistically insignificant variables from Model 1 and Model 3 excludes insignificant variables from Model 2. Eliminating statistically insignificant variables will narrow the focus and save a few degrees of freedom. The rest of this section will review the coefficients for each model.

The "full" regression (Model 1) includes the SPOUSE variable. Since a few universities did not respond to this question, the number of observations in this model was reduced to 140 observations. Nevertheless, the SPOUSE variable was insignificant at any conventional level. A number of variables, however, are statistically significant at 5 percent: ANNUAL, PUBLIC, and REGION. STUDENT, BIOLOGY, and ENGLISH are statistically significant at the 10 percent level.

Since SPOUSE was insignificant, it was excluded from Model 2. Consequently, the number of observations increased to 155. The standard errors for the remaining variables have been reduced, but significance levels are generally the same. A couple of observations can be made about YRSORG and ANNUAL. Namely, YRSORG is insignificant and ANNUAL stipends are proportional to 9-month stipends.

Although YRSORG is negative, indicating a "time effect," it is statistically insignificant. Ehrenberg et al. [2004] provides some evidence that the effectiveness of unions compared to non–unionized campuses decline over time. Between 1996 and 2001, nonunion campuses' stipends increased 13.95%, however, stipends increased 10.65% for unionized campuses. A potential explanation may be the structure of contract negotiations. Contracts are typically negotiated to cover a three to ten year block, which are renegotiated at the end of the term. If either side cannot be placated, and the contract continues, the result may skew the effectiveness over time.

ANNUAL, as it turns out, is proportional to 9-month stipends. Assuming that annual stipends are *exactly* proportional to 9-month stipends, a student would earn 12/9 more. Adjusting for the log-linear regression, the expected regression coefficient would be .28768 ($\ln(12/9) = .28768$). The ANNUAL coefficient in Model 2 is .304, the difference between the two are not statistically significant at the 10 percent level (t-statistic=.4687022). Thus, ANNUAL stipends do not disproportionally increase for the extra three months of work. For Model 3, all of the stipends will be adjusted for annual disbursement and ANNUAL will be dropped.

Both ANNUAL and YRSORG has been deprecated in Model 3. All of the regions are significant at 5 percent. WEST has the biggest wage difference over the SOUTH (14.98%), followed by NORTHEAST (11.25%), and then the MIDWEST (7.89%). The rank and magnitude of the coefficients are not particularly surprising, but the distinction is important nevertheless.

The PUBLIC coefficient (-0.1533) is somehwat expected. The original hypothesis was that private universities, which have higher tuition rates, may compensate students with tuition reimbursement instead of higher stipends. However, stipends at private universities are 15% higher than at public universities, making it unlikely that private universities also compensate with comparatively higher tuition reimbursements.

Finally, the student's discipline also greatly contributes to wage variation. ENGLISH students earn 8 to 15 percent less than MECHANICAL ENGINEERING and BIOLOGY students, respectively. ECONOMICS stipends, however, do not statistically differ from MECHANICAL ENGINEERING students, although, economics majors still make 6.4 percent less than BIOLOGY students.

In summary, PUBLIC, REGION, MAJOR, and STUDENT are all statistically significant. Noticeably missing is UCOV and UMEM which suggests unionization neither reduces nor increases wages. If unionization does not increase stipends, then why do GAs continue to unionize? The next section explores possible explanations and other potential benefits that unionization offers to graduate students.

3.3 Impact of Unions

Neither UCOV nor UMEM are significant at any practical level, indicating that: (1) there is not a union–nonunion wage gap and (2) the extent of unionization does not influence the wage gap. To investigate the effects of unionization further, a 95% confidence interval for UCOV and UMEM from Model 3 is presented below.

UCOV	(-0.0921692, 0.0393971)
UMEM	(-0.0700787, 0.0627416)

Both confidence intervals favor a negative coefficient. Graduate–student unions with collective bargaining power may experience somewhere between a 10 percent decline to 4 percent gain of stipends. Surprisingly, organized unions with no collective bargaining power may experience between a 7 percent decline to 6 percent gain in stipends—a more favorable interval. In the following paragraphs, a few potential explanations are proposed.

One unexpected result is a positive STUDENT coefficient, indicating that when 75% or more of a student's health–care costs is covered, then she will have higher wages. In turn, one might expect unionization will increase the chance of receiving health–care coverage. Similarly, unions may appeal for health–care coverage of spouses. The data set reveals that unionized GAs are more likely to have 75% of their health–care expenses paid by the university than nonunion GAs (see Table 1). Likewise, spouses of unionized GAs are more likely to be covered by the universities' health–care coverage than nonunion GAs. In regards to health–care coverage it is much more beneficial to be unionized. That is, although unionization may not increase stipends, it may increase health–care coverage instead.[7]

Traditionally, collective bargaining power allows members to leverage their negotiating power against the firm. In the case of graduate–student unions, this power may be diminished due to the lack of labor mobility. Other than participating in graduate internships or fellowships, a graduate student does not have many choices besides a position as a graduate assistant. The inability to move to other jobs may limit any serious union negotiations.[8]

Lastly, this data set collected the gross stipends payments, not hourly data. The exclusion of hourly wage data may overlook the potential fact that unions help reduce overtime hours.[9] It is entirely possible that some disciplines require more work from their GAs than others. The next section will cover some more qualifications from a limited data set.

4 Qualifications

Due to the limited data set, it is necessary to make some further qualifying remarks. Some shortcomings have already been mentioned (e.g. hourly data). Any further study would need to be more extensive and holistic. This section will provide some detailed suggestions.

The analysis here was a campus–level study, that is, each campus within a school system were an independent observation. For example, the Berkeley, Davis, Irvine, San Diego, and Santa Barbara campuses of the University of California were all independent observations. This raises methodological questions about "double–counting" highlighted by Ito and Masoner [1981] and Brown and Stone [1981]. Using each campus as an independent observation may essentially be "double–counting" since a collective bargaining contract applies to all campuses in the same system [Ito and Masoner, 1981].[10] However, in this study, there is a plausible reason to include all of the individual University of California campuses. Berkley, which unionized in 1989, did so 11 years before Davis, Irvine, San Diego, and Santa Barbara. Nevertheless, extending the

[7] Fortunately, this can be tested using a Probit regression, but was excluded in order to narrow the research scope.

[8] Something closely related to this is prestige and signaling. Overall, completing a graduate education promises higher wages or previously unattainable jobs. Likewise, a more prestigious university can promise an even higher wage gain. Similar to forgoing full–time wages as an undergraduate, graduate students may be fine with lower wages for the promise of higher wages in the future. See related examples in Spence [1974], Jaeger and Page [1996].

[9] For an example of how unions are effective at reducing overtime hours, see Trejo [1993].

[10] Brown and Stone [1981] disagreed that it qualifies as "double counting" arguing that "less aggregated data are preferable to more highly aggregated data. . . "

data set to include other systems (e.g. City University of New York (CUNY) or State University of New York (SUNY), may raise the aforementioned methodological problems.

Furthermore, the use of cross–section studies is not as explicative as panel data sets. As the availability of panel data has increased, cross–section studies have declined 52 percent from 1985 to 1997 [Moffitt, 1999]. Incorporating hourly wage data into a longitudinal study would reveal whether unionization effectively increases wages, health–care coverage, or reduced hours worked.

Also, using a cross–section data set excludes the possibility of testing for the endogeneity of unionism. All but one UCOV observation was a public university, which, in turn, has a tendency to have lower wages. Consequently, it is not clear if public universities are more likely to organize, or if the public universities' low wages influence unionization.[11] A time–series model would enable us to test for endogeneity of the union variable, specifically using the Hausman [1978] test.

As alluded to in the previous section, it would be helpful to obtain the number of hours worked for two reasons: (1) we would be able to calculate an hourly wage, and (2) we could estimate if unions reduced the number of hours worked. This topic does not require any additional treatment here, but a more detailed discussion about the exclusion of hourly data can be found in Lewis [1986].

5 Conclusion

There is no evidence that unionization—either with or without collective bargaining power—will increase wages, which agrees with the findings of Ehrenberg et al. [2004]. Even experienced unions do not seem to influence stipend amounts. However, a graduate student's stipends are influenced by her major, geographic region, and institution type.

The implicit goal of this paper is to lend some evidence to the scholarly debate about the effect and purpose of graduate–student unions. We have reached a bit of a conundrum since unionization does not appear to increase stipends but GA unions remain popular. This study includes a number of possible reasons why unions are shown to be ineffective: (1) GAs are only employed for a few years, making it difficult to increase wages; (2) lack of mobility to other jobs; (3) unions actually increase fringe benefits: tuition waivers and health–care compensation; and (4) data inaccuracies, including the omission of hourly stipends. Nevertheless, at the current juncture, it appears that unionization does not increase stipends.

[11] Ehrenberg et al. [2004] suggests another starting point of unionization. They suggest graduate students in the humanities form pressure to unionize. Likewise, unionization may benefit a certain department instead of an entire university, namely, the humanities. This hypothesis can be tested with a cross–section data set and interaction terms; however, this would require a larger data set with many more observations to gain significant interaction terms.

6 Tables

Table 1: Descriptive Statistics

	All Campuses		Union		Nonunion	
Variable	Mean	Std. Dev.	Mean	Std. Dev.	Mean	Std. Dev.
WAGE	14026.60	3285.750	13647.10	3177.670	14442.10	3372.65
Log(WAGE)	9.522200	0.230851	9.494360	0.235688	9.552670	0.223044
UCOV	0.322581	0.468979	0.617284	0.489078	N/A	N/A
UMEM	0.200000	0.401297	0.382716	0.489078	N/A	N/A
YRSORG	3.445160	8.088100	6.592590	10.24300	N/A	N/A
ANNUAL	0.251613	0.435347	0.209877	0.409758	0.297297	0.460188
ENGLISH	0.251613	0.435347	0.246914	0.433903	0.256757	0.439826
ECONOMICS	0.283871	0.452336	0.296296	0.459468	0.270270	0.447131
BIOLOGY	0.245161	0.431577	0.234568	0.426369	0.256757	0.439826
PUBLIC	0.638710	0.481932	0.851852	0.357460	0.405405	0.494322
STUDENT	0.735484	0.442505	0.851852	0.357460	0.608108	0.491505
SPOUSE	0.250000	0.434568	0.375000	0.487520	0.117647	0.324585
SOUTH	0.212900	0.410690	0.074074	0.263520	0.364860	0.484680
NORTHEAST	0.251610	0.435350	0.283950	0.453720	0.216220	0.414470
MIDWEST	0.277420	0.438990	0.271600	0.447560	0.283780	0.453910
WEST	0.258060	0.438990	0.370370	0.485910	0.135140	0.344200

Table 2: Coefficient Estimates of Graduate Assistant Wages

	Estimated Coefficients and Standard Errors		
Variable	Model 1	Model 2	Model 3
UCOV	−0.03194	−0.009881	−0.026386
	(0.04421)	(0.04033)	(0.03328)
UMEM	0.01571	−0.004263	−0.003669
	(0.03812)	(0.03380)	(0.03360)
YRSORG	−0.0005315	−0.001336	N/A
	(0.002475)	(0.001942)	
ANNUAL	0.3061**	0.3040**	N/A
	(0.03930)	(0.03566)	
ENGLISH	−0.08002*	−0.07700**	−0.08468**
	(0.04144)	(0.03835)	(0.03382)
ECONOMICS	−0.02860	−0.01940	−0.02739
	(0.04095)	(0.03757)	(0.03292)
BIOLOGY	0.06983*	0.06308*	0.06433*
	(0.03662)	(0.03437)	(0.03410)
PUBLIC	−0.1520**	−0.1536**	−0.1533**
	(0.03823)	(0.03200)	(0.03182)
NORTHEAST	0.08494**	0.1133**	0.1125**
	(0.03960)	(0.03619)	(0.03599)
MIDWEST	0.08922**	0.08146**	0.07897**
	(0.03872)	(0.03668)	(0.03635)
WEST	0.1689**	0.1473**	0.1498**
	(0.04269)	(0.03831)	(0.03763)
STUDENT	0.06440*	0.05402*	0.05078*
	(0.03261)	(0.02973)	(0.02928)
SPOUSE	−0.01031	N/A	N/A
	(0.03664)		
α	9.424**	9.433**	9.732**
	(0.04707)	(0.04449)	(0.03877)
n	140	155	155
$\bar{R}^2$	0.6139	0.6071	0.3383

* indicates significance at the 10 percent level
** indicates significance at the 5 percent level

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