

THE FUNDING OF ECONOMICS RESEARCH: DOES SOCIAL CAPITAL MATTER FOR SUCCESS AT THE NATIONAL SCIENCE FOUNDATION?

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Abstract

Utilizing data on research proposals submitted to the National Science Foundation (NSF) Economics program over the past five years, this paper examines whether the social capital stock of grant applicants enhances their access to research resources by increasing the probability of being awarded a research grant. We find that along with the reputational rank of the institution from which a grant application is submitted and an applicant's previous record of success, the grant applicant's stock of social capital, given by his membership in a scholarly network, appears to be an important determinant of whether or not an economics research proposal is funded.

JEL Classification: *A19, C19, C25*

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I. Introduction

The process by which the National Science Foundation (NSF) funds research grants through its Economics Program is often seen as mysterious, and even biased (Wachtel, 2000, Tremblay, 1992), by the community of research economists who constitute the grant applicant pool. Other than what can be inferred from an earlier analysis by Newlon (1993), and the unpublished results of Arora and Gambardella (1998), very little is known empirically about what determines whether or not a grant application submitted to the NSF Economics Program is successful.

Science as an enterprise is governed by social processes (Kuhn, 1970), and Fountain (1997) argues that increasingly, specific institutional and social arrangements are important for success in science. One particular social arrangement that merits consideration is the set of networks, norms and trust that facilitate coordination and cooperation for mutual benefit (Putnam, 1993). This arrangement engenders an asset that is referred to as "social capital".

The term social capital was coined by Glenn Loury (1977). In later refinements, he articulated it to encompass networks of social affiliation among individuals that promote the acquisition of skills and traits valued in the marketplace (Loury, 1995). To the extent that scientists are able to coalesce in groups that engender social capital which improve the efficiency of their activities, they will enjoy a competitive advantage in pursuing their ends (Burt, 2000). Our goal in this paper is to determine the extent to which the social capital engendered by scholarly affiliations among economic scientists promotes the development of research projects deemed worthy of funding by the NSF Economics Program.

If social capital, like human capital, is to be an operative and coherent concept, access to social resources should be conditioned upon it (Durkin, 2000). This is a testable implication of any theory that incorporates social capital as a concept explaining the choices and outcomes of optimizing agents. Thus, if social capital matters for economists who submit grant applications to the NSF Economics Program, one expected consequence is that relative to grant applicants

without, or with less, social capital, success rates in obtaining research resources are higher.

Our empirical strategy utilizes data from research proposals submitted over the past 5 years to determine if factors that measure membership in a scholarly social network affect the probability of success in winning a NSF grant for economics research. We pursue this by treating the success or failure of a grant application as a binary variable that is a function of the applicant's characteristics as reported and inferred from the submitted grant application.

Our approach builds upon that of Arora and Gambardella (1996) in considering social capital endowments as possible factors determining whether or not a grant application submitted to the NSF Economics Program is successful. If membership in a scholarly social network is correlated with the quality of ideas that produce research, but is not correlated with the ability of grant applicants, a grant-awarding process that is sensitive to group acquired social characteristics relative to individual characteristics represents a departure from a meritocratic ideal that, arguably, should govern how science is pursued, encouraged and rewarded.

We do not include any direct measures of a proposal's merit as determined by the critical assessment of outside reviewers and sitting advisory panels. Of course, current NSF practice evaluates the individual merits of a grant applicant's proposal. However, given the likely importance of NSF funding for the career and scholarly prospects of economists as individuals, it is worth exploring the extent to which an applicant's endowment of social capital, as measured by membership in a scholarly social network, influences the award decision.¹ If group characteristics like social capital acquired through scholarly networks matter and are impor-

¹NSF research support for economists is likely to be important for at least two reasons. First, as Wachtel, (2000 p. 22) has recently argued "The imprimatur of an NSF grant carries significant leverage by aiding in acceptance of articles by the major journals, receiving further grants from private foundations and other government funding agencies, and career advancement". Second, successful grant applicants can be viewed as having satisfied the standards of reviewers who are in many instances scientists that establish and enforce the norms that govern publications in refereed journals. The importance of learning such norms, and its effect on publishing in journals has been considered by Ellison (2000).

tant for subsidizing research in economic science, then current practice may be engendering an inequality in access to resources that, in the long-run, can be inimical to scientific progress.

The remainder of this paper is organized as follows. The second section provides a conceptual framework for social capital and membership in scholarly societies/organizations. Section three describes the data, and process by which the NSF Economics Program funds economics research. In section four, we report parameter estimates from specifications where the NSF award decision is treated as a dichotomous dependent variable conditioned on a grant applicant's self-reported and derived characteristics, including those which measure an applicant's stock of social capital. The last section concludes.

II. Scholarly Affiliations, Social Capital, and Idea Production

Similar to Loury (1995), Burt (2000) offers a conceptualization of social capital in which it is a social structure that can create for certain individuals, or groups, a competitive advantage in pursuing their ends. The essential idea is that "better connected people enjoy higher returns" (Burt, 2000 p. 3), to things such as their efforts and talents. As social structures and networks, the scholarly societies and organizations of economists can be viewed as social capital that are potentially a source of competitive advantage in producing ideas which lead to publishing articles, books, monographs, and obtaining monetary resources to subsidize such activities.

The NSF Economics Program funds research in economic theory, method, and application. Economics scholarly societies and organizations are entities that either bestow honors on those who have been responsible for the creation of important ideas, and/or spread them through periodic meetings, workshops, conferences and symposia. To the extent that economics scholarly societies/organizations are a form of social interaction that engender knowledge externalities (Collier, 1998), then members could be learning how to generate better ideas that form the basis of research proposals, relative to non-members.²

²Collier (1998) describes one possible knowledge externality engendered by social interaction as that

Our aim in this paper is to determine the extent to which the social capital endowment of economists, given by whether or not they are either a Fellow of the Econometric Society (FES) and/or an associate of the National Bureau of Economic Research (NBER), matters for success in obtaining research grants from the NSF Economics Program. If economists who are FES/NBER affiliated, as a result of interacting with other members, reap returns from their interaction in terms of producing high quality ideas that constitute the basis of research proposals submitted to the NSF Economics program, then social capital could be an important determinant of the probability of getting funded from the NSF Economics Program.³

Conceptually, we follow an approach to social capital similar to Durkin (2000), and Glaeser, Laibson, and Sacerdote (2000), by viewing social capital as an individual characteristic. We assume that individual economists produce ideas according to a production function $r_i = f(S_i, O_i)$, where r_i is the idea output of economist i , S_i is his stock of social capital, O_i is his stock of other non-social capital, and f is a differentiable function.⁴ It is further assumed that the quality of ideas is proportional to r_i , which is increasing in both the stock of social and other non-social capital.

The NSF Economics Program is assumed to grant awards to research proposals that reflect

which results from agents copying and/or pooling knowledge, which enables all agents to improve upon their decisionmaking.

³We do not interpret an impact of FES or NBER status as an indicator of bias on the part of reviewers, panel members, or NSF Program Directors in favor of a particular applicant – in fact, an individual’s NBER or Econometric Society affiliation is likely not to be apparent to most reviewers. Of course biases may exist. For example, Broder’s (1993) analysis of proposals submitted to the NSF Economics Program shows that relative to male proposal referees, female proposal referees rate female-authored proposals lower.

⁴The stock of non-social capital, for which an individual uses to produce ideas, includes human capital. Theoretically, the distinction between human and social capital is not sharp one, and it is likely that investments in social and human capital are correlated. For example, Glaeser, Laibson, and Sacerdote (2000) report results showing that years of schooling is positively correlated with numerous measures of group membership, including membership in a professional or academic society.

ideas of the highest quality. Given the proportional relationships between idea quality and the arguments of the economist/grant applicant idea production function, our model predicts that the probability of success for obtaining a research grant from the NSF Economics Program increases with respect to the applicant's social and non-social capital.

III. Data

Our data are derived from the past five years of grant applications submitted to the NSF Economics Program, which generally receives 300 to 400 grant proposals per year, reviewed in two cycles starting mid-January and mid-August. Most proposals, limited to 15 pages of substantive text, request 3 years of support, which typically includes 2 months of summer support, graduate student support, travel expenses and some modest support for supplies. On receipt of proposals, the three program directors in economics (of whom 2 are "rotators" on one or two year leaves from academic institutions, and not NBER or FES affiliated) send them each to 6 reviewers, of whom 3 or 4 may be drawn from a list of suggested reviewers provided by grant applicants. In addition to obvious personal or financial conflicts of interest, reviewers may not be affiliated with the institution of the grant applicant, and a proposal submitted through NBER may not be reviewed by a leader of one of NBER's research programs (or more generally a paid employee of NBER). On average, about 4 of these so-called ad hoc reviews are returned.

In April and November, a panel of 14 economists (no more than one from any one institution, and serving for overlapping terms of two years) meets to make recommendations, based both on their own reading of the proposals and on the external reviews; panel members are excluded from discussion of proposals involving conflicts of the type mentioned above (and no more than half of the panel members can be NBER associates). Final funding decisions are made by program directors, guided of course by panel and external reviewer recommendations, and in recent years about 1/3 of the submitted proposals have been funded (although often at

levels lower than requested).

In the empirical analysis to follow we consider all grant proposals evaluated by the Economics program at NSF during the 1996-2000 fiscal years, excluding proposals for conferences, planning grants, dissertation improvement grants, very small grants (under \$20,000) and very large grants (over \$2,000,000). This leaves 1420 proposals, of which 482 awards were made for a success rate of 33.9%. Of these, men submitted 1245 proposals and received 431 awards (34.6%), and women submitted 175 proposals, receiving 51 awards (29.1%). By institutional quality, Tier 1 institutions submitted 213 proposals, receiving 111 awards (52.1%), Tier 2 institutions submitted 187 proposals, receiving 87 awards (46.5%), Tier 3 institutions submitted 269 proposals, receiving 106 awards (39.4%), and all other institutions submitted 751 proposals, receiving 178 awards (23.7%).⁵

Based upon what grant applicants self-reported, and what we could derive, we are able to identify the following information on these 1420 grant proposals: whether or not the research proposal was funded by the NSF Economics Program (AWARD), race and ethnicity (BKHIS), gender (MALE), previous NSF awards (PREAWD), whether the grant applicant has submitted a research proposal to the NSF Economics program previously (PREPRO), the institutional tier of the college/university at which the grant applicant is employed (T1, T2, T3, or T4), requested budget (RQAMT), whether or not the grant applicant is an NBER associate (NBER) or Fellow of the Econometric Society (FES), and experience (EXPER).⁶

⁵The 4 Tiers are based on the National Research Council's 1995 reputational rank of Economics departments in the U.S. Tier 1 is Chicago, Harvard, MIT, Stanford, and Princeton; Tier 2 is Yale, Berkeley, Pennsylvania, Northwestern, and Minnesota; Tier 3 is UCLA, Columbia, Michigan, Rochester, Wisconsin, UC-San Diego, New York University, Carnegie Mellon, Cornell, California Institute of Technology, and Maryland; Tier 4 – the omitted group in our statistical analysis – consists of all other institutions.

⁶AWARD is a dummy variable that equals one if the research proposal was funded. BKHIS is a dummy variable that equals one if the grant applicant self-reports being Black or Hispanic. MALE is a dummy variable that equals one if the grant applicant is a male. PREAWD is a dummy variable that equals one if the grant applicant has received an NSF award prior to the current grant application.

Table 1 reports on the mean and standard deviation of each variable for the entire sample, and for categories of scholarly networks (NBER and/or FES), that grant applicants in the sample were affiliated with at the time the research proposal was submitted. Several generalizations about the sample of research proposals are quite clear from a look at Table 1: (1) submitted proposals are overwhelmingly from non-Hispanic white males; (2) almost three-quarters of all proposals came from researchers who had previously submitted proposals, (and almost half of all proposals came from those previously receiving awards); and (3) the success rates of Econometric Society fellows and NBER associates are well above the overall sample mean. While the first two of these points suggest a need to broaden the pool of potential grantees, it is the last point we investigate further in this paper.

IV. Results

Our empirical approach is based upon a presumption that the objective of program directors in the NSF Economics Program is to fund research proposals that exceed some threshold of assessed quality. The threshold for the funding decision is based on an unobserved latent variable y^* that is proportional to the quality of the grant applicant's idea. The latent variable y^* is not observed, however if a proposal is funded $y = 1$, otherwise y is zero. The decision

PREPRO is a dummy variable that equals one if the grant applicant had submitted a proposal prior to the current grant application. T1, T2, T3, and T4 are dummy variables equal to one if the grant applicant is employed at an institution that is in a four tier ranking based on the National Research Council's 1995 reputational ranking of economics departments. RQAMT is the requested amount of funds in the grant application. NBER and FES are dummy variables that equal one if the grant applicant is an associate of the NBER and Fellow of the Econometric Society, respectively. Membership in the NBER and FES was determined by matching the name of the grant applicant with the published on-line member list of the NBER and FES located at www.nber.org and www.econometricsociety.org, respectively. EXPER is the difference between the fiscal year in which the grant application was received, and the year in which the grant applicant earned his doctorate as reported on the grant application.

to fund a research proposal occurs when $y^* > 0$. Let X_i be the i th argument of a research applicant's idea production function with an associated marginal impact of β_i , our primary structural model for the probability of a research proposal being funded is:

$$\begin{aligned} Prob(y^* > 0) &= Prob(\sum \beta_i X_i + \epsilon > 0) \\ &= Prob(\epsilon < \sum \beta_i X_i) \\ &= F(\sum \beta_i X_i) \end{aligned}$$

where ϵ is a normally distributed error, and $F(\cdot)$ is a cumulative distribution function.

Table 2 reports Probit parameter estimates across 5 specifications of the structural model that determines whether or not a research proposal is funded. As a goodness-of-fit measure the Pseudo-R² of McElvey and Zavoina (1975) is reported. The specification in columns (1) and (2) include only the social capital and institutional tier variables. The Pseudo-R²'s suggest that alone, these three variables explain at most 43 percent, approximately, of the variation in awards made to grant applicants.

In columns (3) and (4) we augment the specifications by adding several control variables that can be viewed as measures of, or suitable proxies for, an individual grant applicant's stock of non-social capital. The parameter estimates reveal that experience in the economics profession has a negative impact on the funding decision, as does the amount of funds requested.⁷ It is also apparent that those who have previously submitted NSF proposals and those who have previously received awards have increased probabilities of receiving funding. The race and gender variables have no significant impact.

The parameter estimates reported in Table 2 are striking in a way that suggests the primacy

⁷We investigated, in results not reported here, whether this declining impact of experience is avoided by NBER/FES researchers. The interaction terms were not statistically significant suggesting that whatever positive role that form of social capital plays it does not reverse what seems to be an advantage held by newer researchers.

of a grant applicant's stock of social capital in the grant awarding process. The significant and positive impact of having an NBER and Econometric Society affiliation remains robust across all specifications.⁸ When we add a dummy variable, TOP, for submissions from the leading academic institutions (those classified above as Tiers 1 through 3), this also has a significant positive effect on award probability though NBER and FES retain significance (only slightly diminished in magnitude).⁹ Comparing the Pseudo-R² of the specification in column (1) to that of column (4), it is seen that augmenting the specification with non-social capital variables only increases the correlation between the observed and predicted values of awards values by approximately 8 percent.¹⁰ This suggests that a grant applicant's stock of social capital explains most of his success (or failure) in obtaining research funding from the NSF Economics Program.

The variables NBER and FES may be picking up unobserved quality of investigators, rather than social capital involved in participating in those scholarly networks. That is, it might be argued that an NBER associate or Econometric Society Fellow at a lesser institution is simply a much better scholar than his/her colleagues at that institution. However, if so, we would anticipate that the impact of NBER and FES would be less important for those from the top tier schools, and more important at these lesser institutions. In column (4) this is addressed and we find that the interaction of NBER and FES with the quality of institution is not close to significance, which tends to support the social capital interpretation.¹¹

⁸In results not reported, we constructed an additional variable for those in both scholarly networks (FES and NBER), but it was never significant, and had no impact on the other estimated coefficients. We also tried including an additional variable indicating proposals submitted through NBER (a subset of those by NBER associates); this variable was never significant.

⁹In results not reported here, we included separate dummies for Tiers 1 through 3, but found all to be significant and no statistically significant difference among their estimated coefficients.

¹⁰The reported Pseudo-R²'s can be interpreted as the regression variation divided by the total variation in the latent variable specification governing the award process.

¹¹Of course, it is likely that at least part of the NBER/FES advantage reflects a screening role by those networks. Montgomery (1991) for example, offers a theoretical analysis showing that in labor markets,

For the parameter estimates in specification (3) and (4), the significance of PREAWD indicates that having a previous award engenders future success in getting a grant. If however, the process governing success in getting a previous award has a structure similar to the process governing current success, the overall process governing success could be recursive with a correlated error structure. To examine the possibility of a feedback from previous award to current award, and the effects it has on the parameters, columns (5a) and (5b) of Table 2 report bivariate probit parameter estimates where the structure governing both previous and current awards is given by:

$$\begin{aligned}
 Prob(y_1^* > 0) &= Prob(\sum \beta_i X_{1i} + \beta y_2 + \epsilon_1 > 0) \\
 Prob(y_2^* > 0) &= Prob(\sum \beta_i X_{2i} + \epsilon_2 > 0) \\
 Var(\epsilon_1) &= Var(\epsilon_2) = 1 \\
 Cov(\epsilon_1, \epsilon_2) &= \rho
 \end{aligned}$$

where $y_1 = \text{AWARD}$, $y_2 = \text{PREAWD}$, and ρ is the covariance and correlation between the error terms in the two specifications.¹²

The parameter estimates reported in specifications (5a) and (5b) of Table 2 are for $\sum \beta_i X_{1i} - \sum \beta_i X_{2i} = \beta_i \text{PREPRO} + \beta_i \text{RQAMT}$.¹³

Qualitatively, the bivariate probit results in column (5a) are quite similar to the column (4) estimates. Column (5b) reports parameter estimates for the previous award specification. As is the case for the current award specification, FES and NBER increase the likelihood that the principal investigator on a proposal had received a previous NSF award. In what seems initially to be inconsistent with earlier results, experience has a positive impact on having previously

employee referrals from social networks serve to screen for high ability workers, who, in equilibrium, earn higher wages than employees without referrals or connections to social networks.

¹²For a more detailed exposition and application of bivariate probit methods, see Greene (1998, 2000).

¹³Since the variables RQAMT and PREPRO are only available for the most recently awarded grant, they are omitted from the specification for PREAWD.

received an award and the quality of the investigator's institution has no impact. However, the first result simply reflects that the longer one has been in the profession, the more likely he/she is to have received a previous award, *ceteris paribus*, while the second result most likely is due to the fact that TOP is capturing the investigator's current institution, not necessarily the institution from which the previously successful proposal was submitted.

Judging by the value of the Pseudo-R², the bivariate probit specification does not add any substantial explanatory power.¹⁴ However, the results do reveal that once the advantage of having a previous award is controlled for, the pattern of significance revealed in the univariate parameter estimates remains essentially the same. The estimated value of the correlation in the error terms is negative, but insignificant. The insignificance of ρ does not imply that AWARD and PREAWD are not correlated. To the extent that ρ measures the correlation in omitted variables in the specification for AWARD and PREAWD, the insignificance suggests that there are no omitted variables from the specifications for AWARD and PREAWD that are correlated.

Table 3 reports the estimated marginal effects of each variable on the probability of grant success for the 5 estimated specifications.¹⁵ The effects of being an NBER associate and/or Fellow of the Econometric Society have a substantial marginal impact on the probability of a research proposal being funded. In general, Table 3 reveals that, in rank order, FES, TOP, and NBER have the largest effects on the probability of a research proposal being funded. Viewing the specification in (5a) as a benchmark, being a Fellow of the Econometrics Society increases the probability of a research proposal being funded by approximately 22 percentage points. Being an NBER associate increases the probability of a proposal being funded by approximately 15 percentage points, which in the case of the specification in (5a), is equivalent to the gain

¹⁴For the bivariate probit specification, the Pseudo-R² was obtained from a univariate probit specification where the parameters were restricted to the values reported in column (5a) of Table 2.

¹⁵All marginal effects are evaluated at the mean values of the independent variables utilizing routines for computing univariate and bivariate probit marginal effects provided by Greene (2000) in the LIMDEP 7.0 Econometric Software.

from being employed as an economics professor in a top-tiered economics department.

As the FES and NBER variables are measures of an individual grant applicant's social capital stock, their dominance in terms of marginal impact support the idea that social capital enables access to research funds from the NSF. This is then consistent with Durkin (2000), in finding a systematic relationship between measures of group membership and access to resources through the social relationships made possible by group membership.

V. Conclusion

Increasingly, economists are considering, both theoretically and empirically, the role of social capital in determining economic outcomes, and in enabling access to resources. The results presented here provide some evidence that within their own profession access to publicly subsidized research resources is enhanced by membership in scholarly networks. We show that for grant applications submitted to the NSF Economics Program, applicants with an NBER or Econometric Society affiliation have a higher probability of success in obtaining funding. Rather than reflecting a bias by reviewers, we argue that the results, holding even after controlling for the quality of the investigator's institution and previous grant success, are more likely due to higher quality grant proposals submitted by those with NBER or FES affiliations. However, the higher quality of ideas produced by members of these scholarly networks may be a consequence of the knowledge externalities engendered by the social interaction that takes place among their members. It is ultimately these knowledge externalities that form the basis of the research proposals funded by the NSF Economics Program.

Our results have implications for public science policy. Ideally, publicly subsidized research funds should be allocated on the basis of objective standards of merit that are specific to individuals. Our results suggest that objective merit, as indicated by the decision of the NSF Economics Program to fund a research proposal, is determined to a large extent by an individual grant applicant's stock of social capital. If, following Loury (1995, p. 103),

we define absolute equality of opportunity to mean a meritocratic principle that values a reward structure in which an individual's chances at success depend only on his innate abilities, then a research grant awarding process which favors individuals with particular social capital endowments would seem to be a departure. Given inequalities in the social capital endowments of scientists, this would constitute a public science policy that engenders further inequalities in research capabilities among the population of economic scientists.

The results reported here also have at least two broader policy implications. First, our results suggest that NBER and the Econometrics Society (and other such networks) should aggressively seek out a young and diverse group of scholars. Second, there may be a role for NSF and other funding agencies to consider support to alternate networks which could generate social capital for economists who are neither NBER associates nor Fellows of the Econometric Society. Such an intervention, by creating new forms of social capital, could increase the stock of high quality ideas worthy of public research support among a broader population of research economists.

Table 1
Sample Characteristics

Variable	Sample	FES	NBER Associates	FES/NBER Associates
<i>AWARD</i>	.339 (.474)	.617 (.487)	.489 (.500)	.709 (.457)
<i>BKHIS</i>	.042 (.201)	.013 (.114)	.053 (.225)	.013 (.112)
<i>MALE</i>	.875 (.330)	.982 (.132)	.915 (.279)	1.0 (0.0)
<i>PREAWD</i>	.449 (.497)	.934 (.241)	.627 (.484)	.937 (.245)
<i>PREPRO</i>	.733 (.442)	.982 (.132)	.832 (.374)	.962 (.192)
<i>T1</i>	.150 (.357)	.264 (.442)	.359 (.480)	.456 (.456)
<i>T2</i>	.132 (.338)	.273 (.446)	.136 (.342)	.278 (.451)
<i>T3</i>	.189 (.392)	.181 (.385)	.231 (.422)	.126 (.335)
<i>T4</i>	.529 (.499)	.282 (.451)	.274 (.446)	.139 (.348)
<i>RQAMT</i>	198851.29 (123364.19)	254339.68 (113110.01)	236131.25 (124649.36)	277441.75 (108325.60)
<i>NBER</i>	.265 (.441)	.348 (.477)	1.0 (0.0)	1.0 (0.0)
<i>FES</i>	.159 (.367)	1.0 (0.0)	.210 (.408)	1.0 (0.0)
<i>EXPER</i>	12.75 (9.72)	22.31 (8.72)	12.85 (9.42)	20.04 (7.76)
<i>N</i>	1420	227	376	79

Notes:

Standard deviations are reported in parentheses.

RQAMT expressed in dollars.

N = number of observations.

Table 2
Probit Parameter Estimates
Of Structural Model

Specification	(1)	(2)	(3)	(4)	(5a)	(5b)*
Variable:						
<i>Constant</i>	-.702 (.045) ^a	-.850 (.054) ^a	-.902 (.134) ^a	-.925 (.136) ^a	-1.03 (.145) ^a	-1.12 (.122) ^a
<i>FES</i>	.831 (.094) ^a	.738 (.096) ^a	.633 (.114) ^a	.643 (.177) ^a	.549 (.271) ^b	1.09 (.227) ^a
<i>NBER</i>	.507 (.078) ^a	.384 (.082) ^a	.295 (.085) ^a	.433 (.141) ^a	.374 (.185) ^b	.627 (.152) ^a
<i>TOP</i>	- -	.398 (.075) ^a	.395 (.078) ^a	.453 (.095) ^a	.424 (.101) ^a	.057 (.097)
<i>EXPER</i>	- -	- -	-.014 (.005) ^a	-.014 (.005) ^a	-.019 (.009) ^b	.053 (.004) ^a
<i>MALE</i>	- -	- -	-.052 (.112)	-.057 (.112)	-.049 (.110)	-.061 (.117)
<i>BKHIS</i>	- -	- -	.096 (.181)	.095 (.181)	.099 (.188)	-.059 (.195)
<i>PREPRO</i>	- -	- -	.281 (.104) ^a	.285 (.105) ^a	.284 (.104) ^a	- -
<i>PREAWD</i>	- -	- -	.464 (.095) ^a	.464 (.096) ^a	.732 (.537)	- -
<i>RQAMT</i>	- -	- -	-.0000006 (.0000003) ^b	-.0000006 (.0000003) ^a	.0000006 (.0000004)	- -
<i>NBER × TOP</i>	- -	- -	- -	-.211 (.173)	-.207 (.171)	.067 (.189)
<i>FES × TOP</i>	- -	- -	- -	-.019 (.205)	-.034 (.210)	.511 (.290) ^b
<i>N</i>	1420	1420	1420	1420	1420	1420
<i>Pseudo-R²</i>	.417	.428	.449	.450	.458	-
<i>ρ</i>	- -	- -	- -	- -	-.147 (.325)	- -

Notes:

Standard errors are reported in parentheses.

*Dependent variable is PREAWD.

^aSignificant at the .01 level.

^bSignificant at the .05 level.

N = number of observations.

Table 3
Marginal Effects

Specification	(1)	(2)	(3)	(4)	(5a)
Variable:					
<i>FES</i>	.302 (.034) ^a	.267 (.035) ^a	.227 (.041) ^a	.230 (.063) ^a	.223 (.062) ^a
<i>NBER</i>	.184 (.028) ^a	.139 (.029) ^a	.106 (.030) ^a	.155 (.050) ^a	.148 (.049) ^a
<i>TOP</i>	- -	.144 (.027) ^a	.141 (.028) ^a	.162 (.034) ^a	.150 (.041) ^a
<i>EXPER</i>	- -	- -	-.005 (.002) ^a	-.005 (.001) ^a	-.004 (.002) ^b
<i>MALE</i>	- -	- -	-.019 (.040)	-.020 (.040)	-.019 (.037)
<i>BKHIS</i>	- -	- -	.034 (.065)	.034 (.065)	.031 (.062)
<i>PREPRO</i>	- -	- -	.101 (.037) ^a	.102 (.037) ^a	.095 (.037) ^b
<i>PREAWD</i>	- -	- -	.166 (.034) ^a	.166 (.034) ^a	.245 (.149)
<i>RQAMT</i>	- -	- -	-.0000002 (.0000001) ^b	-.0000002 (.0000001) ^a	.0000002 (.0000002)
<i>NBER × TOP</i>	- -	- -	- -	-.076 (.062)	-.068 (.060)
<i>FES × TOP</i>	- -	- -	- -	-.007 (.073)	.009 (.076)

Notes:

Standard errors are reported in parentheses.

^aSignificant at the .01 level.

^bSignificant at the .05 level.

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