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**Working Paper**

## Nepotism, incentives and the academic success of college students

IZA Discussion Papers, No. 3711

**Provided in Cooperation with:**

IZA – Institute of Labor Economics

*Suggested Citation:* Gevrek, Deniz; Gevrek, Zahide Eylem (2008) : Nepotism, incentives and the academic success of college students, IZA Discussion Papers, No. 3711, Institute for the Study of Labor (IZA), Bonn,  
<https://nbn-resolving.de/urn:nbn:de:101:1-2008101499>

This Version is available at:

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IZA DP No. 3711

## Nepotism, Incentives and the Academic Success of College Students

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September 2008

# **Nepotism, Incentives and the Academic Success of College Students**

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## ABSTRACT

### **Nepotism, Incentives and the Academic Success of College Students<sup>\*</sup>**

This study investigates the role of self-employed parents on their children's post-graduation plans and college success by using a unique data set from a private university in Turkey. We assembled data set by matching college students' administrative records with their responses to a survey we designed. Self-employed parents have a strong negative effect on college success even after accounting for possible ability bias, intergenerational human capital transfers and controlling for various individual characteristics. This suggests that the changing importance of self-employment can alter the amount and mix of human capital flows. The children of self-employed parents are also more likely to have entrepreneurial intent, and are less likely to plan to attend graduate school.

JEL Classification: J24

Keywords: academic success, self-employment, post-graduation plans

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<sup>\*</sup> We are very grateful to Daniel S. Hamermesh, Steve J. Trejo, Gerald S. Oettinger, Stephen G. Donald, Gönül Sengül and our sister G. Sevi Gevrek for their continued support and helpful discussions. We would also like to thank Ronald L. Oaxaca, Price V. Fishback, and the participants of seminars at the University of Texas at Austin and The University of Arizona for their helpful comments. Thanks to Michiel Johan Paus for the access to the administrative data; and Daniel S. Hamermesh, Anne Marie Jennings and Harsh Kalan for their editorial assistance.

## I. Introduction

Within the organization of a family, parental influence is central in molding a child's behavior. The occupational and educational choices of the parents may have far-reaching effects not only on their own lives but also on future generations. For instance, the children of self-employed fathers are more likely to become self-employed (e.g., Lentz and Laband [1990], Dunn and Holtz-Eakin [2000] and Hout and Rosen [2000]).

This study explores the impact of parents' occupational choices on their offspring's educational outcomes. It examines the role of self-employed parents on their children's post-graduation plans and college success. Previous studies indicate that college success, measured by GPA, is correlated with factors including individual and family characteristics, social background and individual discipline (e.g., Betts and Morell [1999]; Irandoust and Karlsson [2002]). None, however, considers family businesses and self-employed parents as factors affecting students' incentives to exert effort in college. Parental self-employment and family business ownership may imply a larger set of post-graduation opportunities for a college student, but they may affect the incentives to obtain additional human capital during college.

According to human capital theory, additional years of education acquired by attending college add valuable skills to the stock of human capital and increase productivity. As per signalling theory (Spence [1974]), a college diploma may not add to individual productivity but has an informational value by signalling innate ability. Either theory can explain the choice of a high school senior who lacks the safety net of a family business to go to college. Students with family businesses may also choose to enroll in college to insure themselves against the future uncertainty about the relative returns to different post-graduation plans. Regardless of the availability of a larger set of post-graduation

employment options, a rational individual may choose to enroll in college.

When a job requires at least a college degree, years of schooling may lose their signalling and human capital values for the pool of college graduates. In this case, employers may focus on other information, such as GPA.<sup>1</sup> College GPA may affect a student's probability of finding a job irrespective of signalling ability or acting as a proxy for human capital. Moreover, it is well established that college GPA may affect earnings. An extensive literature substantiates the impact of college GPA and college class rank on post-graduation earnings (e.g., Weisbrod and Karpoff [1968], Wise [1978], James et al. [1989], Ehrenberg and Sherman [1999] and Hamermesh and Donald [2008]).

Family business ownership may affect the incentives to succeed in college. Students with family businesses may exert less effort in college if they anticipate a secure job and earnings in the family business regardless of their college success. This may be true because parents may have a better idea about their offspring's ability than other potential employers, so that the signalling value of the college GPA becomes unimportant. Also, the family may simply favor its members over other individuals. Aspiring entrepreneurs with family businesses may put more emphasis on managerial and industry-specific human capital obtained through work experience than on task-specific career-oriented human capital acquired in college.<sup>2</sup>

Recent research on nepotism and firm performance shows that nepotism may be an important issue in the U.S. economy. Pérez-González (2006), using data from the chief

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<sup>1</sup>For instance, in the USJOBS website - the federal government's official one-step source of jobs and employment information - the applicants are asked to report their college GPAs.

<sup>2</sup>Lentz and Laband (1990) distinguish between the general occupational skills acquired via college education and job-specific skills or managerial human capital acquired by experience. Lazear (2004) finds that among Stanford MBA alumni, the entrepreneurs study a more varied curriculum in the program compared to those who work as employees.

executive officer (CEO) successions of publicly traded U.S. corporations, calculates that 36.4 percent of the these firms' CEO successions involved nepotism. The firms that promote related CEOs significantly underperform those that promote unrelated CEOs.<sup>3</sup> Also, family CEOs who attended selective colleges perform better than CEOs who did not.<sup>4</sup> A high GPA may strongly predict future productivity as reflected in the performance of a business. The lower performance of related CEOs could stem from their lesser effort while in school, which previous studies have not controlled.

We use a unique data set that we constructed by matching information from two different sources. The first part comes from a survey we initiated and conducted in December 2006.<sup>5</sup> We surveyed students in the College of Economics and Administrative Sciences at a major private university in Turkey. The second part of the data set comes from the confidential administrative records of the university. While we are well aware of the possible uniqueness of the Turkish labor market, the same point could be made about any national market. Moreover, matching the survey data with students' administrative records would have been extremely difficult in the United States due to different privacy regulations.

This study investigates the role of self-employed parents and post-graduation employment opportunities in shaping the incentives for college success. Further, our work suggests that if family businesses employ relatives with lower levels of human capital, they may incur non-market costs and put themselves in a less competitive position compared to non-family businesses. Favoritism of this kind may affect the health and success of

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<sup>3</sup>Bennedsen et al. (2007) find a negative impact of related CEOs on the performance of Danish firms.

<sup>4</sup>The author defines a selective college as an undergraduate institution that is classified as very competitive or better in Barron's, 1980, profiles.

<sup>5</sup>See Appendix for the questionnaire.

these businesses and of the economy.

The empirical findings suggest that family businesses and self-employed parents have a strong negative effect on college students' GPAs, after controlling for demographic characteristics, ability, college major, and parental education. GPAs of male students with two self-employed parents or only a self-employed mother are the lowest, even after controlling for ability bias. The impact of self-employed parents on female students' GPAs is similar to that on male students' GPAs, except when the female student has only a self-employed mother, for whom parental self-employment has a positive impact on GPA. By using the surveyed sample and accounting for possible survey non-response bias, we find that the children of self-employed parents are more likely to have entrepreneurial post-graduation plans. The impact of having only a self-employed father on future self-employment plans is large, while the impact of having two self-employed parents on entrepreneurial intent is even larger. Students with self-employed parents are not only more likely to plan to be entrepreneurs, but they are less likely to plan to attend to graduate school. These results suggest additional incentive effects beyond any that we observe operating pre-graduation from college.

The next section introduces the theoretical framework that analyzes the different levels of effort made by college students. Section III describes the data set and gives a broader picture of the Turkish educational system. In Section IV and V, we present the empirical model, report the results, and discuss their robustness. Conclusions are presented in Section VI.

## **II. Theoretical Model**

The objective of this theoretical framework is to understand how the presence of family



businesses may affect students' effort and success in college. After enrolling in college, individuals choose the level of effort to exert in classes. A student who studies harder is more likely to get a higher GPA than an otherwise identical student. For simplicity, we assume that a student with no family business may choose to work as an employee after graduation.

College students with family businesses face a larger set of choices upon graduation. They may choose to work as employees or to work in their respective family businesses. The literature on the intergenerational transfer of self-employment suggests that students with family businesses are more likely to become self-employed upon graduation than those who do not have family businesses. It suggests two possible explanations for this phenomenon. First, in the presence of capital market imperfections, successful entrepreneurs may relax the capital market constraints on their offspring by transferring their wealth (Dunn and Holtz-Eakin [2000]). Second, intergenerational transfer of self-employment may result from parents' passing work experience, managerial human capital and industry-specific knowledge on to their children.

Students who plan to be self-employed may not value college success as highly as other students. Given time constraints, aspiring entrepreneurs have to allocate their time between leisure, studying for college classes and augmenting their managerial and industry-specific human capital by interning and by working part time or by volunteering. The costs of acquiring managerial and industry-specific human capital and work experience are likely to be lower for a student with a family business, because she may have better access to business experience. In this case, future entrepreneurs may choose to exert less effort in college simply because of time constraints, different relative returns to college success and the possible lower relative cost of acquiring managerial business-specific human capital.

## A. Environment

Here, we do not consider the human capital investment at the extensive margin. Human capital is not measured by the number of years of schooling; rather we consider it at the intensive margin by measuring the level of effort, which, in turn, determines a student's GPA. After enrolling in college, students make their post-graduation employment plans in the first period. For simplicity, we ignore discounting. The students may choose to work as employees or become self-employed by working for their respective family businesses once they graduate from college during the second period. Utility, defined as  $U(y_i, l_i) = \alpha_1 \ln y_i + \alpha_2 \ln l_i$ , is a function of  $y_i$ , earnings in the second period and  $l_i$ , leisure chosen in the first period. The parameters  $\alpha_1$  and  $\alpha_2$  measure relative consumption/leisure preferences.

If a student chooses to be an employee, she maximizes her utility to determine  $l_i$  and  $y_i$ . Output is a function of  $e_i$ , the effort spent on acquiring task-specific and career-oriented human capital in college. If she chooses to work for the family business, in addition to determining  $l_i$  and  $e_i$ , she picks out the level of  $m_i$ , effort spent on managerial and industry-specific human capital. The effort costs of  $e_i$  and  $m_i$  are measured in units of time. The total time available to a student while in college is  $T$ . The time spent on investing in different types of human capital and leisure must satisfy the constraint  $e_i + l_i \leq T$  for an employee and  $e_i + m_i + l_i \leq T$  for a future self-employed person. In the second period, the students supply one unit of labor inelastically.

Earnings as an employee depend on  $\mu_i$ , which captures the effect of personal characteristics (e.g., race, marital status, gender, physical appearance) and college grade point average.  $GPA_i = e_i^{\beta_i} \epsilon$  is a function of  $e_i$  and  $\epsilon$ .<sup>6</sup> An individual-specific  $\beta_i$  shifts the

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<sup>6</sup> $\epsilon$  is a random element with a mean of one and a finite variance.

production function for college GPA and captures individual ability. The output of an employee is  $y_i(GPA_i, \mu_i) = GPA_i \mu_i$ . The utility of a future employee is given by  $U(y_i, l_i) = \alpha_1 \ln(e_i^{\beta_i} \epsilon \mu_i) + \alpha_2 \ln l_i$ .

Earnings of a self-employed person are  $f(GPA_i, m_i, \mu_i) = GPA_i [m_i(1 + \psi_i)]^{\theta_i} \mu_i$ , which is a function of college  $GPA_i$ , effort spent on acquiring managerial industry-specific human capital  $m_i$ , and personal characteristics  $\mu_i$ . The parameter  $\theta_i$  reflects the ability of an individual as an entrepreneur and the ease with which one can obtain managerial expertise, reputation or industry-specific knowledge. The parameter  $\psi_i \in [0, 1)$  measures the extent of favoritism. If  $\psi_i \in (0, 1)$ , there is nepotism in the sense that the contribution of  $m_i$  is overvalued by the family.  $\psi_i = 0$  if there is no nepotism involved. The utility of a future entrepreneur is  $U(y_i, l_i) = \alpha_1 \ln\{e_i^{\beta_i} \epsilon [m_i(1 + \psi_i)]^{\theta_i} \mu_i\} + \alpha_2 \ln l_i$ .

We focus on the role of future employment decisions and the impact of family businesses on the optimal  $e_i$ . A student who will work as an employee chooses  $e_i$  and  $l_i$  to maximize her utility  $U(y_i, l_i) = \alpha_1 \ln(e_i^{\beta_i} \epsilon \mu_i) + \alpha_2 \ln l_i$ , subject to the time constraint  $e_i + l_i \leq T$ . The optimal solution to this constrained maximization problem is:

$$e_i^* = \frac{\alpha_1 \beta_i T}{\alpha_1 \beta_i + \alpha_2} \quad (1)$$

$$l_i^* = \frac{\alpha_2 T}{\alpha_1 \beta_i + \alpha_2}. \quad (2)$$

The optimal effort level  $e_i^*$  for a future employee is increasing in the parameters  $\alpha_1$ ,  $\beta_i$  and decreasing in  $\alpha_2$ .

Conditional on choosing to be self-employed after graduation, a student determines the level of  $m_i$ , as well as  $e_i$  and  $l_i$  to maximize her utility,  $U(y_i, l_i) = \alpha_1 \ln\{e_i^{\beta_i} \epsilon [m_i(1 + \psi_i)]^{\theta_i} \mu_i\} + \alpha_2 \ln l_i$ , subject to the time constraint  $e_i + m_i + l_i \leq T$ . The solution to this

constrained maximization problem yields optimal  $e_i^{**}$ ,  $m_i^{**}$ , and  $l_i^{**}$ :

$$e_i^{**} = \frac{\alpha_1 \beta_i T}{\alpha_1 \beta_i + \alpha_1 \theta_i + \alpha_2} \quad (3)$$

$$m_i^{**} = \frac{\alpha_1 \theta_i T}{\alpha_1 \beta_i + \alpha_1 \theta_i + \alpha_2} \quad (4)$$

$$l_i^{**} = \frac{\alpha_2 T}{\alpha_1 \beta_i + \alpha_1 \theta_i + \alpha_2}. \quad (5)$$

Similar to the previous case, a future entrepreneur's optimal effort in college,  $e_i^{**}$  is increasing in  $\alpha_1$  and  $\beta_i$  and is decreasing in  $\alpha_2$ . Regardless of their post-graduation plans, students with higher  $\beta_i$  spend more time on  $e_i$ .

Unlike the student who chooses to be an employee, a future entrepreneur's  $e_i^{**}$  is decreasing whereas  $m_i^{**}$  is increasing in  $\theta_i$ . Students who have higher entrepreneurial ability and better access to industry-specific managerial human capital (high  $\theta_i$ ) will exert less effort ( $e_i^{**}$ ) in school, and they will place greater emphasis on acquiring managerial human capital ( $m_i^{**}$ ). As shown in equations (1) and (3), the optimal effort exerted in college classes by future entrepreneurs and future employees are not identical. Comparing two students, the one who opts for self-employment will exert less effort in college ( $e_i^* = \frac{\alpha_1 \beta_i T}{\alpha_1 \beta_i + \alpha_2} > e_i^{**} = \frac{\alpha_1 \beta_i T}{\alpha_1 \beta_i + \alpha_1 \theta_i + \alpha_2}$ ).

So far, we have considered effort and leisure choices conditional on making post-graduation plans. Now, we turn our attention to the factors affecting post-graduation employment decisions. The utility from being an employee is  $U(y_i^*, l_i^*) = \alpha_1 \ln[(e_i^*)^{\beta_i} \epsilon \mu_i] + \alpha_2 \ln l_i^*$ , and that from self-employment is  $U(y_i^{**}, l_i^{**}) = \alpha_1 \ln\{(e_i^{**})^{\beta_i} \epsilon [m_i^{**}(1 + \psi_i)]^{\theta_i} \mu_i\} + \alpha_2 \ln l_i^{**}$ . A student opts for self-employment if,

$$\alpha_1 \ln\{(e_i^{**})^{\beta_i} \epsilon [m_i^{**} (1 + \psi_i)]^{\theta_i} \mu_i\} + \alpha_2 \ln l_i^{**} > \alpha_1 \ln[(e_i^*)^{\beta_i} \epsilon \mu_i] + \alpha_2 \ln l_i^*. \quad (6)$$

The inequality indicates that entrepreneurial intent depends not only on  $\mu_i$ , and  $\theta_i$ , but also on nepotism,  $\psi_i$ . In the presence of nepotism, i.e.  $\psi_i \in (0, 1)$ , the left side of the above inequality increases in  $\psi_i$ . As a result, students are unsurprisingly more likely to become self-employed upon graduation.

The model provides two empirically testable hypotheses. First, the offspring of self-employed parents are more likely to become self-employed. Second, students with self-employed parents will on average have lower GPAs, because they are more likely to become self-employed after graduation.

### III. A New Data Set

The empirical analysis in this study relies on two data sources. The first part comes from an in-class survey we designed and administered to students in the College of Economics and Administrative Sciences of a private university in Turkey.<sup>7</sup> The survey was conducted in December 2006, spanning a period of three weeks. In order to improve the survey, we pre-tested it on a group of 20 students from another college in the same university. The students of the College of Economics and Administrative Sciences answered detailed questions about their personal and family characteristics, GPA, scholarship status, post-graduation plans, number of younger and older siblings, and family business

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<sup>7</sup>The College of Economics and Managerial Sciences offers the following majors: Economics, Economics (Honors), Business Administration, Business Administration-Economics, Business Administration-Economics (Honors), Government, International Relations and International Finance.

characteristics if applicable.

The second part of the data set comes from the administrative records of all sophomore, junior and senior students in the College.<sup>8</sup> The administrative data contain detailed information on each student's GPA, gender, age, year in college, the Turkish Central University Entrance Exam score or the Student Selection Examination (SSE) score, major, scholarship status, parents' education levels and occupations. We are able to match the surveyed individuals with their administrative records.

Of the 1,122 sophomore, junior and senior students in the College of Economics and Administrative Sciences, we obtained responses from 499 (44.5 percent). The non-surveyed sample consists of the students who failed to attend class on the day of the survey. The probability of surveying a student may depend on a student's course load along with other determinants of attendance, such as the weather and idiosyncratic shocks. Therefore, the students with heavier course loads are expected to be more likely to appear in our surveyed sample, because they are more likely to be present in a greater number of classes compared to those with lighter loads. The item non-response rate among the surveyed students was very low, since we monitored students closely and insisted that they respond to as many questions as possible.

Summary statistics for the entire sample (1,122), surveyed (499) and non-surveyed (623) samples are presented in Table 1. The first row shows that the surveyed students have higher than average cumulative GPAs on a four-point scale. Consistent with expectations, the surveyed students take more classes (6.12 per semester) compared to others (5.88 per semester). The surveyed students are slightly younger, and there are many more

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<sup>8</sup>The freshmen students are excluded from the sample since their GPAs were not reported by December 2006.

female students among the respondents. The surveyed students, on average, have higher SSE scores. The educational attainment of the parents are similar for surveyed and non-surveyed students. The average educational attainment of mothers is 11.55 years, while that of fathers is 13.37 years. Seventy-four percent of mothers are either housewives, unemployed or retired. This percentage is consistent with the 25.5 percent labor force participation rate reported by the State Institute of Statistics based on the 2000 Turkish Household Labor Force Survey.

The distributions of parental occupations for the entire sample suggest that almost 45 percent of the fathers and 6 percent of the mothers are non-professional self-employed individuals.<sup>9</sup> Tansel (2001) calculates more recent figures for occupational distributions classified by urban and rural residence, based on the 2000 Turkish Household Labor Force Survey. Self-employed males make up 27 and 50 percent of the urban and rural labor forces respectively, while self-employed females make up 5 and 14 percent respectively. The occupational distributions of the parents in our sample are thus similar to those of males and females in Turkey based on the calculations from Census and Household Survey data sets.

U.S. self-employment rates are somewhat different from the ones in our sample. For instance Fairlie (1999) calculates that the U.S. self-employment rate for whites is 15.23 percent. Hout and Rosen (2000), report a 24.2 percent self-employment rate for fathers, while Dunn and Holtz-Eakin (2000) find that the overall propensities for self-employment for fathers and mothers are 30 percent and 9 percent, respectively.

Having a self-employed parent does not necessarily imply that the family owns a

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<sup>9</sup>The self-employed category does not include the professionals such as doctors, lawyers, consultants, and accountants among others.

business. A family business requires having employees other than self-employed parents. Of 191 surveyed students who have self-employed fathers, however, only four reported that their father is the only worker in the business. The rest of these 191 students reported that their family businesses employed anywhere from two to 1,000 people. Out of these 191 students, 103 of their self-employed parents do not employ non-family members at the management level. Students with two self-employed parents and those with only self-employed mothers reported similar family business structures and self-employment patterns to those with only self-employed fathers.

Table 1 shows the distribution of post-graduation plans of the surveyed students. Sixteen percent of the students plan to work in their family businesses, and four percent are planning to start a new business. We consider these two groups of students as “first-degree entrepreneurs.” Twenty percent of the surveyed students said that they are planning to work as employees, while 7 and 17 percent of them said that their post-graduation plans involve either “working as employees first, and then working for their family businesses,” or “working as employees first, and then starting a new business,” respectively. We regard these two groups of students as “second-degree entrepreneurs.” Thirty-three percent said that they are planning to go to graduate school and three percent said that they have other plans.

Table 2 shows the mother-father matched parental occupation distributions for the entire sample and the surveyed sample. The upper panel of Table 2 shows that out of 1,122 students, 499 have non-professional self-employed fathers, while only 64 have non-professional self-employed mothers. Forty-six students reported having two non-professional self-employed parents. The most common type of couple is the housewife/non-working mother and non-professional self-employed father. The lower panel shows that



out of 499 surveyed students, 191 and 28 have non-professional self-employed fathers and mothers, respectively.

### A. The Turkish Educational System

In Turkey the only gateway to enter college is the Student Selection Exam (SSE). The SSE has questions that test knowledge of high school curricula and students' verbal, quantitative and analytical reasoning abilities.<sup>10</sup> The Turkish Student Placement Center states that the SSE has two objectives: a) To assure a balance between the demand for higher education and the number of spots available in higher education institutions; and b) To select and place students with the highest probability of success in appropriate higher education programs by considering their preferences and performance on SSE. The SSE score is well accepted in Turkey as a good proxy for a student's ability post-high school graduation.

The SSE is conducted every year in mid-June.<sup>11</sup> In 2006, 1,570,357 students took the test. Public universities had 163,844 spots, while private universities had 24,045 spots. Only 156,120 students enrolled in public universities and 16,111 enrolled in private universities. In Turkey, public and private universities differ, especially in tuition and other fees. Public university tuition costs for academic year 2006-2007 varied between \$82 and \$682, while private university tuition is approximately \$10,600 per year.

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<sup>10</sup>The Turkish Student Placement Center, the government agency that administers the SSE, describes the verbal parts of the SSE's content as "proficiency in the Turkish language, and the ability to reason, using social science concepts and generalizations," while "the major components of the quantitative parts of the tests are the ability to make use of basic mathematical concepts and rules and ability to reason, using natural science concepts and generalizations."

<sup>11</sup>See the detailed information on SSE from this link, "<http://www.osym.gov.tr/BelgeGoster.aspx?F6E10F8892433CFF7A2395174CFB32E15F640FC6104C033D>"

## IV. Impact of Self-Employed Parents on College Success

The productivity of a self-employed person depends not only on the level of task-specific and career-oriented human capital, but also on managerial and industry-specific human capital. Children of self-employed parents are expected to have easier access to managerial and industry-specific human capital, and their productivity as entrepreneurs may be higher due to intergenerational transfer of entrepreneurial ability. The first empirically testable hypothesis implied by the model and the literature on the intergenerational transfer of self-employment is that offspring of self-employed parents are more likely to become self-employed. The second hypothesis is that students with self-employed parents are expected to have lower GPAs on average. In this section we test these two hypotheses.

The empirical model is given by:

$$\begin{aligned}
 GPA_i = X_i' \delta_0 + \delta_1 SE_{father\ only} + \delta_2 SE_{mother\ only} + \delta_3 SE_{both\ parents} + \\
 \beta_1(F \times SE_{father\ only}) + \beta_2(F \times SE_{mother\ only}) + \\
 \beta_3(F \times SE_{both\ parents}) + \epsilon_i
 \end{aligned} \tag{7}$$

where  $i$  indexes students. The dependent variable is the cumulative college GPA as of November 2006. The indicator variables,  $SE_{father\ only}$ ,  $SE_{mother\ only}$  and  $SE_{both\ parents}$ , equal one if only the father or only the mother or both parents are non-professional self-employed individuals.<sup>12</sup> In order to see if self-employed parents have differential effects on their sons' and daughters' GPAs, we include an indicator variable for female students and its interaction with  $SE_{father\ only}$ ,  $SE_{mother\ only}$  and  $SE_{both\ parents}$ . If parental self-employment has a

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<sup>12</sup>The omitted group is the students with no self-employed parent.

negative effect on male students' GPAs, the estimates of the coefficients  $\delta_1$ ,  $\delta_2$ , and  $\delta_3$  will be negative and statistically significant. If the self-employment experiences of the parents have different effects on male and female students, the coefficients of the interaction terms will be statistically significant.

The explanatory variable set in equation (7) contains  $X_i$ , which is the vector of demographic, individual and parental characteristics, and  $\epsilon_i$ , the error term. If parents of students with low GPAs took the unlikely path of becoming self-employed to secure the future of their offspring, then the indicator variables for parental self-employment,  $SE_{father\ only}$ ,  $SE_{mother\ only}$ ,  $SE_{both\ parents}$ , and the interaction terms are potentially endogenous to the GPA equation. In this case, the coefficient estimates of these variables are biased and inconsistent. We believe that reverse causality of this kind is highly unlikely, because parents generally make their occupational choices much before than their children are enrolled in college.

Unobserved ability bias arises if the occupational choices of parents and parental ability, which is expected to be highly correlated with the offspring's ability, are correlated. More specifically, if high-ability parents are less likely to be self-employed, the negative coefficients for the presence of self-employed parents are downward biased, and vice-versa. We tackle this issue by including two proxy variables for unobserved ability, the SSE scores of students and variables measuring parental education levels.

Table 3 shows the results of estimating equation (7) for three alternative specifications that add successively more controls to the set of explanatory variables. In the first we include gender, age, hours studied, family income, self-employed parents, and female and self-employed parents interaction variables.<sup>13</sup> Column 1 reveals that the impact of having

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<sup>13</sup>Data on family income and number of hours spent studying are available for surveyed students only.

only a self-employed (non-professional) father on a male student's GPA is estimated to be -0.19 and is highly significant.<sup>14</sup> The impact of having only a self-employed mother on a male student's GPA is -0.35 and is significant at the one percent level. The GPAs of male students with two self-employed parents are on average 0.47 points lower than those of male students with no self-employed parents.

The F-test rejects the equality of the impact of different parental self-employment types for male students, i.e.  $H_0 : SE_{father\ only} = SE_{mother\ only} = SE_{both\ parents}$  is rejected. Having two self-employed parents or having only a self-employed mother have the strongest negative impact on male students' GPAs, implying that the different self-employment statuses of parents differently influence male students' college success.

The GPAs of female students with no self-employed parents are on average 0.15 points higher (significant at the one percent level) than those of male students with no self-employed parents. Column 1 shows that the coefficients of  $(F \times SE_{father\ only})$ ,  $(F \times SE_{mother\ only})$  and  $(F \times SE_{both\ parents})$  are not statistically significant. This implies that on average the self-employment status of parents does not differentially affect their sons' and daughters' college GPAs, when we do not account for possible ability bias.

Column 2 of Table 3 shows the results after augmenting the first specification with the SSE score (a proxy for ability), indicator variables for the year of enrollment or test year, SSE score and test year interactions, and seven indicator variables for college major.<sup>15</sup> The coefficients of  $SE_{father\ only}$ ,  $SE_{mother\ only}$ , and  $SE_{both\ parents}$  are -0.07, -0.23 and -0.30, respectively. Smaller negative coefficients of these variables suggest that if we fail to

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We included two indicator variables for the missing responses of the non-surveyed students.

<sup>14</sup>College GPA is measured out of a maximum of 4 points.

<sup>15</sup>The year of college enrollment and SSE year can be used interchangeably, because in Turkey the SSE scores are only valid for one year.

control for ability, the coefficient estimates for the variables accounting for parental self-employment are downward biased. Therefore, male students with higher ability are less likely to have self-employed parents.

These downward-biased estimates imply a negative correlation between parental ability and self-employment if intergenerational transfers in ability occur and ability correlates positively with college GPA. The coefficient of the ability proxy, the SSE score for the year 2002, is 0.012 (t-value=6.00). For the years 2003, 2004, and 2005, the impact of SSE score on a student's college GPA is also positive yet weaker. The inclusion of this vector of variables generates a positive and marginally statistically significant estimate for ( $F \times SE_{mother\ only}$ ). For female students with only a self-employed mother, without controlling for ability we get downward-biased estimates for the coefficient of ( $F \times SE_{mother\ only}$ ). This downward-biased estimate may be due to the fact that the mothers of high-ability female students are less likely to be self-employed.

### A. Intergenerational Transfers of Ability

A college student's GPA may be positively correlated with parental education levels, conditional on SSE score. Parental education levels are expected to be correlated with parental occupational choices. Failure to control for parental education in the GPA equation may result in biased estimates. If the highly educated parents are less likely to be self-employed, ignoring the parental ability bias will result in downward-biased estimates for variables measuring parental self-employment status.

Column 3 of Table 3 adds two variables that measure parental education level.<sup>16</sup> Interestingly, father's education does not have a statistically significant effect on GPA, while

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<sup>16</sup>The results of Column 3 of Table 3 are not affected if we include eight indicator variables for parental education instead of two continuous variables.

mother’s education has a negative impact on GPA. If highly educated mothers are less likely to be stay-at-home mothers, the negative impact of highly educated mothers may be due to less time devoted to child development. This specification also reveals that possible correlations between parental education and self-employment are insignificant after controlling for individual ability, since the coefficients of variables accounting for parental self-employment,  $SE_{father\ only}$ ,  $SE_{mother\ only}$ ,  $SE_{both\ parents}$ , and  $(F \times SE_{mother\ only})$  and are significant and generally unaffected by the inclusion of parental education. The F-statistics indicate that the variables  $SE_{father\ only}$ ,  $SE_{mother\ only}$ ,  $SE_{both\ parents}$  and their interactions with the female indicator are jointly significant in the GPA equation for all three specifications. Interestingly, we fail to reject the null hypothesis that the sum of the effects of having only a self-employed mother or a self-employed father is equal the effect of having two self-employed parents ( $H_0 : SE_{father\ only} + SE_{mother\ only} = SE_{both\ parents}$ ).

The OLS results suggest that the children of the self-employed have, on average, lower GPAs even after controlling for ability bias. If we assume that they would follow their parents’ self-employment by either working for their family businesses or starting new businesses, these students may have had fewer incentives to exert high effort even in high school. This lack of incentive would then be reflected in their SSE scores, which are based on the weighted raw exam score and high school GPA. To examine this issue, we test whether the SSE scores differ systematically between the offspring of self-employed parents and other parents for various parental self-employment structures. The null hypothesis is that the difference between the average SSE scores of the students with or without self-employed parents is not statistically different from zero.<sup>17</sup> If the null hypothesis is rejected,

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<sup>17</sup>The groups are the ones with only self-employed fathers, only self-employed mothers, self-employed fathers, self-employed mothers, and two self-employed parents. We exclude any professional self-employed parents.

the SSE scores of students with self-employed parents differ from those of other students and selection may be an important issue. Table 4 shows that even though students with self-employed parents have slightly lower SSE scores, in each case we fail to reject the equality of the average test scores between the students with and without self-employed parents.<sup>18</sup>

### B. Isolating the Effect of Parents with Professional Occupations

We next investigate whether having a parent with a professional occupation affects GPA. The data set allows us to differentiate between parents who are retired, unemployed/out of the labor force, employees, employers and professionals.<sup>19</sup> The professionals may be self-employed (those who have their own private practices), employees (those who work for instance in a hospital, or a law firm) or both self-employed and employees at the same time. The indicator variables  $SE_{father\ only}$  and  $SE_{mother\ only}$  equal one if a student has only one non-professional self-employed parent. These students may have another non-self-employed parent in a professional occupation. If having a professionally employed parent correlates negatively with college GPA, the effect of having a non-professional self-employed parent on GPA may be negatively biased.

In order to separate the impact of having a self-employed parent from that of having a professionally employed parent, we consider the impact of different parental employment combinations on GPA. Parental occupation is recoded so that mother/father can either be self-employed (non-professional), professional, or other (retired, unemployed/out of the labor force, or an employee). This recoding gives nine mutually exclusive, parental-matched

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<sup>18</sup>We also included the SSE score and parental self-employment interactions in our regressions. The coefficients of these interaction terms are not statistically significant.

<sup>19</sup>The self-employed group excludes professional self-employed parents. Professional self-employed parents are for instance doctors, lawyers, accountants who have their own private practices.

occupational groups. Table 5 repeats the estimation exercise of Table 3 by including five more indicator variables for parental occupation (the excluded group is students who do not have any self-employed or professional parents) in all three specifications. The coefficients of  $SE_{father\ only}$  and  $SE_{both\ parents}$  are unaffected, while the coefficient on  $SE_{mother\ only}$  is no longer statistically significant when we include five indicator variables. These variables are :  $SE_{father} \wedge Pro_{mother}$  ,  $SE_{mother} \wedge Pro_{father}$  ,  $Pro_{father\ only}$ ,  $Pro_{mother\ only}$  and  $Pro_{both\ parents}$ .

The first column of Table 5 indicates that the students with  $SE_{mother} \wedge Pro_{father}$  ,  $Pro_{father\ only}$ , and  $Pro_{both\ parents}$  have lower GPAs compared to the ones with no self-employed or professional parents. However, starting with the second specification, the coefficients of these three variables are no longer statistically significant. The results show that no matter how finely the parental occupation groups are defined, students with at least one professional parent have GPAs similar to others.

## V. Parental Occupation and Post-Graduation Plans

In this section, we quantify whether different parental employment statuses generate different post-graduation plans. To address this issue, the surveyed students were asked to choose one of the following seven post-graduation plans: 1) work in the family business, 2) start a new business, 3) work as an employee, 4) first work as an employee and then work for the family business, 5) first work as an employee and then start a new business, 6) go to graduate school, 7) or other.

### A. Determinants of Post-Graduation Plans

The model and the previous literature suggest that, if entrepreneurial tendencies are



passed on from parent to child, the children of self-employed people are more likely to be self-employed after graduation. Equations for different post-graduation plans of a student  $i$  can be written as:

$$PGP_{ji} = 1[Z_i'\alpha_{j0} + \alpha_{j1}SEP'_{ji} + \epsilon_{ji} > 0] \quad j = 1, \dots, 6, \quad (8)$$

where  $PGP_{ji}$  for  $j = 1, \dots, 6$  are indicator variables for six post-graduation plan categories excluding “planning to be an employee.”  $SEP_{ji}$  is a vector of explanatory variables for different parental self-employment statuses.  $Z_i$  is a vector of additional exogenous variables that would affect post-graduation plans. These variables are age, SSE score, indicator variables for gender, year of enrollment, and interaction terms for SSE score and year of enrollment. Equation (8) can be estimated as a multinomial logit model.

Table 6 shows the marginal effects evaluated at the sample means relative to the base outcome “planning to be an employee.” The  $SEP_{ji}$  includes two indicator variables:  $SE_{father\ only}$  and  $SE_{both\ parents}$ .<sup>20</sup> Students with only a self-employed father are 26 percentage points more likely to plan to work in their family businesses than to plan to be employees. Strikingly, students with two self-employed parents are almost 62 percentage points more likely to plan to work in their family businesses. Students with only a self-employed father are 7 percentage points more likely to plan to be employees first and then become self-employed after graduation.

Having self-employed parents not only increases the likelihood of a college student’s

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<sup>20</sup>These indicator variables take on a value one if only the father or both parents are non-professional self-employed individuals. We cannot control for  $SE_{mother\ only}$ , since some of the dependent variables (post-graduation plans) do not vary with the variable  $SE_{mother\ only}$ , indicator variable for having only a self-employed mother. For the same reason, we cannot include  $(F \times SE_{father\ only})$  or  $(F \times SE_{both\ parents})$  interaction terms.

entrepreneurial intent, but also it decreases a student's probability of planning to invest further in task-specific human capital. Having two self-employed parents decreases the probability of planning to go to graduate school by 37 percentage points, while having only a self-employed father decreases the probability of planning to go to graduate school by 10 percentage points. Female students are less likely plan to work in the family business or start a new business than to become employees. A rise in family income increases the probability of planning to work in the family business.

In Table 6, the  $\chi^2$ -tests reveal that  $SE_{father\ only}$  and  $SE_{both\ parents}$  are jointly significant at the one percent level. However, the choice-specific (outcome-specific)  $\chi^2$ -tests show that these two variables are not jointly significant for planning to go to graduate school and planning to pursue other future plans equation.<sup>21</sup> To test the validity of using a multinomial logit model, we use Hausman-McFadden's IIA test (1984). The results in Table 6 show the IIA assumption is valid and that a multinomial logit model is appropriate.

## B. Survey Non-Response Bias

A potential problem with the above estimates, which focuses on the surveyed sample only, arises from the possibility of survey non-response bias, a special type of sample-selection problem. The distributions of parental occupations in Table 1 and Table 2 show that students with self-employed fathers are under-represented in the survey.<sup>22</sup> The dependent variable in our multinomial logit model, post-graduation plans, is only available for the surveyed sample. Table 1 demonstrates that the surveyed and the non-surveyed students are not similar along many other dimensions. Therefore, estimation results based

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<sup>21</sup>Refer to Table 6.

<sup>22</sup>Thirty eight percent of the surveyed students have self-employed fathers, while 50 percent of the non-surveyed students have self-employed fathers.

only on the surveyed sample may suffer from a survey non-response bias.

In order to account for this possible bias we estimate the following two-equation binary response model with selection.

$$S_{i1} = 1[Z'_{i1}\delta_1 + \epsilon_{i1} > 0] - \textit{surveyed} \quad (9)$$

$$E_{i2} = 1[Z'_{i2}\delta_2 + \epsilon_{i2} > 0] - \textit{plan to be 1}^{st} \textit{ degree entrepreneur.} \quad (10)$$

We can estimate this two-equation model via a maximum likelihood procedure by making two assumptions: (i) The latent errors,  $\epsilon_{i1}$  and  $\epsilon_{i2}$ , are bivariate normally distributed with zero means, unit variances and a correlation coefficient of  $\rho_1$ . (ii) These latent errors are independent of  $Z_{i1}$ . Equation (10) is the structural equation of interest, where  $E_{i2}$  is a binary indicator that takes on a value of one if student  $i$  plans to be a first-degree entrepreneur after graduation. Equation (9) is the selection equation, where  $S_{i1}$  is the survey response indicator and  $E_{i2}$  is observed only when  $S_{i1} = 1$ . The explanatory variable set in equation (10) contains  $Z_{i2}$ , which is a vector of exogenous variables that would affect post-graduation plans, such as parental self-employment, gender, gender and parental self-employment interactions, age, SSE score, year of enrollment, and interaction terms for SSE score and year of enrollment.

To identify possible survey non-response bias, we need at least one explanatory variable in  $Z_{i1}$  of equation (9) in addition to the  $Z_{i2}$  of the structural equation. Otherwise the identification is from the nonlinearities in the probit equations. A potential identifier should be correlated with whether a student is surveyed or not, but it should not affect post-graduation plans directly. As mentioned in the data section, the probability of responding to our in-class survey is expected to be higher for students who attend many

classes. Therefore the students who take a heavier course load are more likely to appear in our in-class survey.

We use individual current course load to identify survey response. However, the students who have entrepreneurial tendencies may consistently take fewer or more classes compared those lacking entrepreneurial intentions. In this case using current course load to identify the survey response equation without accounting for a student's average course load may be problematic. To solve this problem, we also control for a student's average course load both in the selection equation and in the structural equation. Even if a future entrepreneur takes fewer classes each semester, accounting for the individual average course loads, the current course load should not directly affect future plans. Moreover, as Table 1 shows, current course load is clearly correlated with the probability of being surveyed.

Whether a variable is a valid instrument is always open to debate. Nevertheless we see no reason to assume that the course load taken by a student at the beginning of the Fall 2006 semester, controlling for their average course load over their college career, should affect a student's post-graduation plans (recorded in December 2006). An instrument is strong if its coefficient is highly significant in the survey response equation. Staiger and Stock (1997) suggest that if the t-statistic for an instrument is above  $\sqrt{10}$ , it is considered to be a strong instrument. If  $\rho_1 \neq 0$ , students are non-randomly assigned to the surveyed sample, and the standard probit estimation of the impact of self-employed parents on the entrepreneurial intent without correcting the survey non-response bias will yield biased and inconsistent estimates.

The estimation strategy can be summarized as follows: We estimate the selection equation via probit and get  $\hat{\delta}_1$  in order to construct the conditional densities,  $P(E_{i2} = 1 |$

$Z_{1i}, S_{1i} = 1$ ) and  $P(E_{i2} = 0 \mid Z_{1i}, S_{1i} = 1)$ . Then, we estimate  $\hat{\delta}_2$  and  $\hat{\rho}_1$  via a maximum likelihood model using,  $P(E_{i2} = 1 \mid Z_{1i}, S_{1i} = 1)$ ,  $P(E_{i2} = 0 \mid Z_{1i}, S_{1i} = 1)$  and  $\hat{\delta}_1$ .

Table 7 shows the results of estimating the two-equation model described above for two alternative specifications. The first has an indicator variable,  $(1 \leq SE_{Parent})$ , that takes on a value of one if at least one parent is self-employed, while the second has two indicator variables,  $SE_{father\ only}$  and  $SE_{both\ parents}$ , to control for self-employed parents. The first and fourth columns of Table 7 present the coefficients from the probit selection equation (9). Students with at least one self-employed parent or only a self-employed father are less likely to be in the surveyed sample. In the second specification, the  $\chi^2$ -test reveals that the variables,  $SE_{father\ only}$ ,  $SE_{both\ parents}$ , and their interactions with the female indicator variable are jointly significant in both the selection and structural equations. We find that female students are more likely to be in the surveyed sample. Consistent with our expectations, the coefficient on the identifier variable, the current course load, is positive and highly significant in all specifications (with t-values larger than  $\sqrt{10}$ ). Interestingly students with heavier average course loads are less likely to be surveyed.

The second and fifth columns show the marginal effects after estimating (10) as a probit model without accounting for survey non-response bias. Having at least one self-employed parent, only a self-employed father or two self-employed parents increases the probability of planning to be a first-degree entrepreneur by 26, 27 and 59 percentage points, respectively. The impact of having two self-employed parents is the largest on students planning to be first-degree entrepreneurs. For students with only a self-employed father or two self-employed parents, the self-employment experiences of the parents do not differentially affect children's entrepreneurial intent by gender. Older students and female students are less likely to plan on becoming entrepreneurs.

The last columns of models 1 and 2 show the marginal effects after estimating the second stage of the two-equation model. The coefficients of  $(1 \leq SE_{Parent})$  and  $SE_{father\ only}$  are highly significant and much larger than those predicted from the models that do not control for the survey non-response bias, while the coefficient on  $SE_{both\ parents}$  is not affected. The probability of first-degree entrepreneurial intent increases by 35, 35 and 59 percentage points for the students with  $(1 \leq SE_{Parent})$ ,  $SE_{father\ only}$  and  $SE_{both\ parents}$ , respectively. This increase is over and above the probability of the baseline outcome, which is 20 percent.<sup>23</sup> The negative impacts of age and being female on planning to be a first-degree entrepreneur disappear when we correct for the survey non-response bias.

The Wald test statistics for the independence of latent errors,  $(H_0 : \rho_1 = 0)$ , of the selection and the structural equations are insignificant for both models. Therefore, the Wald tests of independent equations fail to reject the null hypotheses.<sup>24</sup> This result indicates that ignoring selection into the surveyed sample would not render the estimates of the probit model for  $E_{i2}$  equation biased and inconsistent, yet some of the estimates do change after we account for survey non-response bias.

## VI. Conclusions

This study provides evidence that parental self-employment significantly affects students' college GPAs. Our results suggest that GPAs of male students with two self-employed parents or with only a self-employed mother are the lowest. Parental self-employment has a similar impact on female and male college students' GPAs with one exception: Female students with only self-employed mothers have higher GPAs than those

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<sup>23</sup>See Table 1.

<sup>24</sup>The correlation coefficients in Model 1 and Model 2 are insignificant.

female students who do not have any self-employed parents.

An explanation for the lower GPAs of the children of self-employed parents is that in the presence of inter-generational transfers of self-employment and nepotism, offspring are more likely to have entrepreneurial intent. Hence, they may not exert as much effort in acquiring task-specific career-oriented human capital taught in college. As Lazear (2004) suggests, entrepreneurs develop more types of skills than employees, who are expected to specialize in a limited number of skills.

The results also confirm that students with family businesses are more likely to have entrepreneurial tendencies upon graduation. After accounting for survey non-response bias, the probability of having the strongest entrepreneurial intent among the students with at least one self-employed parent is almost 175 percent more than the baseline case. More interestingly, for students with two self-employed parents, this probability is almost 300 percent more than the baseline case. Children of self-employed parents are not only more likely to become self-employed upon graduation, but they are also less likely to plan to attend graduate school.

Future research might investigate the role of sibling order and the number and gender of siblings on post-graduation plans and college success. Preliminary results based on this data set show that the presence and number of older male and female siblings interact with the self-employment status of the parents to affect students' college success and post-graduation plans. For instance, while having only older sister(s) increases the college success of students with no self-employed parents, having only older sister(s) reduces college success of those with self-employed parents. Interestingly, having only older brother(s) has no statistically significant effect on college GPAs of students without self-employed parents, while having only older brother(s) raises the college GPAs of students

with self-employed parents.

Although cumulative college GPA serves as a good measure of college success, future work might utilize the panel data on GPAs and consider the standard deviation of a student's college GPA to measure consistency in reaching and sustaining target GPAs. Another line of research would involve studying the dynamic behavior of college students throughout college.

The influence of family businesses on offspring may result from intergenerational ability transfers, better access to managerial and industry-specific human capital, and nepotism. Future studies may involve understanding the relative importance of intergenerational ability transfers, level of access to managerial and industry-specific human capital, and the influence of nepotism in generating these effects. The limitations of the data set in the current study do not permit these analyses. Regardless of the cause, our results suggest that parental self-employment and family businesses not only affect post-graduation plans, but they also have negative effects on students' college success.



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## Appendix

Dear Friends,

We ask you to participate in our survey that is designed to understand the student profile. We want to investigate the determinants of academic achievement of college students of one of the best universities in Turkey. Please answer the questions correctly and as accurately as possible. The survey will take 5 minutes and your correct and full responses will help us to understand some student characteristics. No information provided by you will be seen by third parties except the two main researchers and submitted information will not be reported in a way that third parties can identify individuals. After matching the student data with the academic records, the names will be erased.

1. First and last name:
2. School number:
3. Age: a)17    b)18    c)19    d)20    e)21    f)22    g)23    h)24+
4. Gender:    a) MALE        b) FEMALE
5. Please write number of siblings you have: I have .....Male;.....Female siblings.
6. Please write the ages of your BROTHERS (if it applies to you):.....;.....;.....;.....;.....;.....;.....;.....;.....;.....;.....;.....
7. Please write the ages of your SISTERS (if it applies to you):.....;.....;.....;.....;.....;.....;.....;.....;.....;.....;.....;.....
8. Does your family have any kind of business?    a) YES    b) NO
9. Did you go to the English Preparation class in University?    a) YES    b) NO
10. Not counting the English Preparation year, Fall 2006 is your.....semester (please circle the correct semester). a) 1st    b) 2nd    c) 3rd    d) 4th    e)5th    f)6th    g)7th    h) 8 +
11. After graduating from college, I plan to:
  - a) Work in the family business.
  - b) Start a new business.
  - c) Work as an employee.
  - d) Work as an employee to gain experience first and then work in the family business.
  - e) Work as an employee to gain experience first and then start a new business.
  - f) Go to graduate school.
  - g) Other.

Consider your answer to the previous question and please write your post-graduation plans if you were asked these questions in the semester/time period below (Example: Ayse was planning to work in the family business during her first year but she changed her plans in her second year and in the third year with going to graduate school. In this case she would answer this question as follows:

1<sup>st</sup>Year a      2<sup>nd</sup>Year f      3<sup>rd</sup>Year f )

Please leave it blank for the semesters you were not enrolled.

<b>12.</b>	<b>13.</b>	<b>14.</b>
1 <sup>st</sup> Year	2 <sup>nd</sup> Year	3 <sup>rd</sup> Year
a)	a)	a)
b)	b)	b)
c)	c)	c)
d)	d)	d)
e)	e)	e)
f)	f)	f)
g)	g)	g)

15. If you have a family business, please write the total number of people (including those holding managerial posts) working in this business:.....

16. If you have a family business, please write the TOTAL number of people from the family who are working in the business:.....

17. If you have a family business, please write the number of people involved in it at **managerial positions** who are NOT from the family:.....

18. If you have a family business, please write the number of people who ARE from the family and who work in **managerial positions**:.....

19. Did you succeed in your first try at the University Entrance Exam (SSE)?

a) YES      b) NO

20. What is your current GPA (as of the end of the last semester?) .....

21. What was your English proficiency when you completed high school?

a) Beginner.      b) Intermediate.      c) Advanced.

22. What was your university entrance exam score corresponding to the area (EQUALWEIGHT2)?  
.....

**23.** Please fill in the circle corresponding to your major.

- |   |  |
|---|--|
| <input type="radio"/> International Relations       | <input type="radio"/> Government                             |
| <input type="radio"/> International Finance         | <input type="radio"/> Economics                              |
| <input type="radio"/> Economics (Honors)            | <input type="radio"/> Business Administration                |
| <input type="radio"/> Business Admin. and Economics | <input type="radio"/> Business Admin. and Economics (Honors) |

Academic year fellowship/scholarship: Please circle the one fits you for each time period.

Question Number→	<b>24.</b>	<b>25.</b>	<b>26.</b>	<b>27.</b>
	2006/2007	2005/2006	2004/2005	2003/2004
a) No fellowships/scholarships.	a)	a)	a)	a)
b) Turkish Edu. Ministry	b)	b)	b)	b)
c) University Merit F.	c)	c)	c)	c)
d) University Sports, Art F.	d)	d)	d)	d)
e) Other Fellowships.	e)	e)	e)	e)

**28.** Pick the type of high school you graduated from:

- |                                     |  |
|-------------------------------------|--|
| a) Private (English as a 2nd Lang.) | f) Public Anatolian (English as a 2nd Lang.) |
| b) Private (Other Lang.)            | g) Public Anatolian.(Other Lang.)            |
| c) Private Science.                 | h) Public Science.                           |
| d) Private Other.                   | i) Public Super.                             |
| e) Regular Public (Straight.)       | j) Public Other.                             |

**29.** Please rank the statement below from 1 to 5 (eg. 1= I totally disagree, 5=totally agree.)

- I take notes in classes:.....
- If you have a family business: I believe that my education will help me in the family business:.....
- If you are planning to start a new business: I believe that my education will help me in my future business:.....

**30.** On average how many hours a day do you study?.....

**31.** On average how many hours a day do you sleep?.....

**32.** Which group does your yearly family income fall into?

- |                         |                         |                         |
|-------------------------|-------------------------|-------------------------|
| a) 0-20 thousand YTL    | b) 20-40 thousand YTL   | c) 40-60 thousand YTL   |
| d) 60-80 thousand YTL   | e) 80-100 thousand YTL  | f) 100-120 thousand YTL |
| g) 120-140 thousand YTL | h) 140-160 thousand YTL | i) 160+ thousand YTL    |

Please choose the education level of your;

Question Number→	<b>33.</b>	<b>34.</b>
	MOTHER	FATHER
a) Grade school graduate/No formal Education.	a)	a)
b) Middle school graduate.	b)	b)
c) High school graduate.	c)	c)
d) University graduate.	d)	d)
e) Graduate school diploma.	e)	e)

Please choose the occupation of your...;

Question Number→	<b>35.</b>	<b>36.</b>
	MOTHER	FATHER
a) Housewife or Does not work.	a)	a)
b) Retired.	b)	b)
c) Wage earner, Works as an employee.	c)	c)
d) Self-Employed/Business owner/Employer.	d)	d)
e) Other Group/Professional (Lawyer, Doctor, Auditor, Pharmacist etc.)	e)	e)

**37.** Please circle the option that applies to you. My parents are:

- a) Divorced.      b) Separated.      c) Together.      d) Other.

**38.** Who do you live with?

- a) Both of my parents.  
 b) With my mother.  
 c) With my father.  
 d) My parents live out of Istanbul, I live in an apartment/dorm.  
 e) My parents live in Istanbul, but I live in a separate apartment/dorm.  
 f) Other

**Table 1**  
**Comparative Summary Statistics for Surveyed and Non-Surveyed Samples**

Variable	All (N=1,122)		Surveyed (N=499)		Non-Surveyed N=623	
	Mean	(SD)	Mean	(SD)	Mean	(SD)
Cumulative GPA	2.42	(0.62)	2.54	(0.62)	2.31	(0.61)
Course Load	5.99	(1.57)	6.12	(1.28)	5.88	(1.76)
Average Course Load	5.72	(1.16)	5.75	(1.22)	5.71	(1.11)
Age	21.49	(1.60)	21.38	(1.67)	21.58	(1.52)
Female	0.49		0.57		0.43	
Major:						
Business Administration & Economics	0.11		0.08		0.13	
Economics	0.12		0.14		0.11	
Government	0.05		0.05		0.05	
Economics (Honors)	0.02		0.01		0.02	
Business Administration & Economics (Honors)	0.03		0.02		0.03	
International Finance	0.12		0.10		0.13	
International Relations	0.19		0.23		0.17	
Business Administration	0.36		0.37		0.36	
SSE Score:	253.30	(62.26)	263.05	(58.77)	245.49	(63.90)
2002	169.29	(17.67)	170.18	(17.70)	168.86	(17.67)
2003	285.47	(33.15)	285.20	(33.83)	285.70	(32.69)
2004	293.07	(28.52)	294.86	(27.02)	291.63	(29.68)
2005	291.70	(37.42)	293.23	(37.02)	288.27	(38.53)
Entrance Year:						
2002	0.30		0.23		0.36	
2003	0.31		0.31		0.31	
2004	0.27		0.27		0.26	
2005	0.12		0.19		0.07	
Post-Graduation Plans:						
Work In Family Business			0.16			
Start New Business			0.04			
Work as Employee			0.20			
Employee→Family Firm			0.07			
Employee→New Firm			0.17			
Graduate School			0.33			
Other			0.03			
Hours Studied			1.79	(1.07)		
Mother's Education	11.55	(4.77)	11.45	(4.74)	11.64	(4.79)
Father's Education	13.37	(4.70)	13.36	(4.70)	13.38	(4.70)

**Table 1 (continued)**

Variable	All (N=1,122)	Surveyed (N=499)	Non-Surveyed (N=623)
	Mean	Mean	Mean
Mother's Occupation:			
Housewife or Does not work	0.61	0.61	0.62
Retired	0.13	0.18	0.08
Works as an Employee	0.15	0.10	0.18
Self-Employed/Business owner/Employer	0.06	0.06	0.06
Professional	0.05	0.05	0.06
Father's Occupation:			
Does not work	0.01	0.01	0.02
Retired	0.15	0.20	0.10
Works as an Employee	0.23	0.13	0.31
Self-Employed/Business owner/Employer	0.45	0.38	0.50
Professional	0.16	0.28	0.07
Family Income:			
0-20 thousand YTL		0.18	
20-40 thousand YTL		0.17	
40-60 thousand YTL		0.12	
60-80 thousand YTL		0.12	
80-100 thousand YTL		0.096	
100-120 thousand YTL		0.08	
120-140 thousand YTL		0.044	
140-160 thousand YTL		0.04	
160+ thousand YTL		0.15	



**Table 2**  
**Parents' Occupation Matched**

Entire Sample						
Mother	Father					All
	Does not work	Retired	Employee	Employer	Professional	
Housewife/Does not work	10	86	125	374	95	690
Retired	3	56	27	34	24	144
Employee	3	18	86	34	23	164
Employer	0	4	9	46	5	64
Professional	0	3	12	11	34	60
All	16	167	259	499	181	1,122

  

Surveyed Sample						
Mother	Father					All
	Does not work	Retired	Employee	Employer	Professional	
Housewife/Does not work	3	48	32	141	81	305
Retired	2	39	11	18	21	91
Employee	1	12	17	6	14	50
Employer	0	1	2	21	4	28
Professional	0	2	1	5	17	25
All	6	102	63	191	137	499

**Table 3**  
**OLS Results: The Effect of Self-Employed Parents on College GPA**

Independent Variables	GPA (Dependent Variable)		
	1	2	3
$SE_{father\ only}$	-0.191*** (0.052)	-0.072 (0.044)	-0.086* (0.045)
$SE_{mother\ only}$	-0.351*** (0.093)	-0.231** (0.096)	-0.216** (0.098)
$SE_{both\ parents}$	-0.469*** (0.086)	-0.301*** (0.088)	-0.297*** (0.086)
Female	0.154*** (0.051)	0.135*** (0.042)	0.139*** (0.042)
Female $\times$ $SE_{father\ only}$	-0.065 (0.073)	-0.015 (0.062)	-0.015 (0.062)
Female $\times$ $SE_{mother\ only}$	0.207 (0.177)	0.272* (0.164)	0.264* (0.159)
Female $\times$ $SE_{both\ parents}$	0.218 (0.160)	0.159 (0.152)	0.160 (0.151)
Family Income/1,000	-0.003*** (0.0005)	-0.001*** (0.0004)	-0.001*** (0.0004)
Family Income (Missing)	-0.374*** (0.075)	-0.254*** (0.066)	-0.246*** (0.067)
Age	-0.028*** (0.010)	0.025** (0.011)	0.020* (0.012)
SSE Score		0.012*** (0.002)	0.011*** (0.002)
Additional Controls †			
Hours Studied	Yes	Yes	Yes
Exam Score $\times$ Year	No	Yes	Yes
Exam Year Indicators	No	Yes	Yes
College Major	No	Yes	Yes
Parental Education	No	No	Yes
F-Statistics and <i>p</i> -values			
Self-Employed Parent Dummies	13.42 (<.001)	5.34 (.001)	5.19 (.001)
Self-Employed Parent Dummies and Self-Employed Parent $\times$ Female	10.61 (<.001)	3.38 (.002)	3.38 (.002)
$SE_{father\ only} = SE_{mother\ only} = SE_{both\ parents}$	5.82 (.003)	4.29 (.013)	3.45 (.032)
$SE_{father\ only} + SE_{mother\ only} = SE_{both\ parents}$	0.33 (.567)	0.00 (.992)	0.00 (.992)
Observations	1,122	1,122	1,122
$R^2$	0.126	0.382	0.385

NOTE. – The dependent variable is the individual GPA. Standard errors are given in parenthesis. The linearized standard errors are derived from a consistent variance-covariance matrix using Huber-White sandwich estimators. \*\*\*, \*\* and \* indicate respectively 1%, 5% and 10% significance levels. The indicator variables for the Business Administration Economics Combined Honors major and test year 2002 are omitted.

†See next page for the parameter estimates of these variables.

**Table 3 (continued)**

Independent Variables	GPA (Dependent Variable)		
	1	2	3
Hours Studied	-0.038 (0.087)	-0.044 (0.074)	-0.048 (0.074)
Hours Studied <sup>2</sup>	0.016 (0.017)	0.018 (0.014)	0.019 (0.014)
Hours Studied (Missing)	-0.024 (0.109)	-0.061 (0.095)	-0.060 (0.095)
Business Administration & Economics		-0.802*** (0.082)	-0.783*** (0.082)
Economics		-0.772*** (0.078)	-0.752*** (0.078)
Government		-0.552*** (0.096)	-0.540*** (0.097)
Economics (Honors)		0.232*** (0.077)	0.240*** (0.078)
International Finance		-0.803*** (0.077)	-0.790*** (0.078)
International Relations		-0.757*** (0.074)	-0.742*** (0.075)
Business Administration		-0.816*** (0.069)	-0.799*** (0.070)
SSE Year 2003		0.446 (0.379)	0.361 (0.379)
SSE Year 2004		0.168 (0.383)	0.076 (0.384)
SSE Year 2005		0.326 (0.499)	0.250 (0.493)
SSE Score× Year 2003		-0.006*** (0.002)	-0.006*** (0.001)
SSE Score× Year 2004		-0.005*** (0.001)	-0.004** (0.002)
SSE Score× Year 2005		-0.005*** (0.001)	0.005** (0.002)
Father's Education			-0.009 × 10 <sup>-1</sup> (0.042)
Mother's Education			-0.008** (0.003)

**Table 4**  
**Testing the Equality of the SSE Scores by Parents' Occupation**

	<u>N</u>	<u>Mean</u>	<u>SE</u>	t-value
<u>(Only) Father Employer</u>				
Other	669	255.34	2.48	
Employer (Non-Professional)	453	250.29	2.79	
difference		5.05	3.78	1.33
P-value				(.18)
<u>(Only) Mother Employer</u>				
Other	1,104	253.66	1.87	
Employer (Non-Professional)	18	230.92	16.69	
difference		22.74	14.78	1.53
P-value				(.12)
<u>Father Employer</u>				
Other	623	255.67	2.60	
Employer (Non-Professional)	499	250.33	2.63	
difference		5.34	3.74	1.42
P-value				(.15)
<u>Mother Employer</u>				
Other	1,058	253.79	1.92	
Employer (Non-Professional)	64	245.20	7.35	
difference		8.59	8.03	1.97
P-value				(.28)
<u>Both Parents</u>				
Other	1,076	253.41	1.90	
Employer (Non-Professional)	46	250.78	7.85	
difference		2.62	9.37	0.28
P-value				(.78)

**Table 5**  
**The Impact of Professional Parents on College GPA**

Independent Variables	GPA (Dependent Variable)		
	1	2	3
(i) SE <sub>father only</sub>	-0.270*** (0.042)	-0.080** (0.037)	-0.091** (0.038)
(ii) SE <sub>mother only</sub>	-0.250* (0.142)	-0.068 (0.131)	-0.056 (0.126)
(iii) SE <sub>both parents</sub>	-0.418*** (0.082)	-0.231*** (0.078)	-0.221*** (0.078)
(iv) SE <sub>father</sub> $\wedge$ Pro <sub>mother</sub>	-0.237 (0.148)	-0.108 (0.106)	-0.071 (0.104)
(v) SE <sub>mother</sub> $\wedge$ Pro <sub>father</sub>	-0.260** (0.109)	-0.012 (0.120)	0.007 (0.116)
(vi) Pro <sub>father only</sub>	-0.127** (0.059)	0.013 (0.051)	0.017 (0.051)
(vii) Pro <sub>mother only</sub>	-0.199 (0.131)	-0.062 (0.141)	-0.031 (0.141)
(viii) Pro <sub>both parents</sub>	-0.179* (0.101)	-0.059 (0.052)	-0.018 (0.085)
Family Income/1,000	-0.003*** (0.0005)	-0.001*** (0.0004)	-0.001*** (0.0004)
Family Income (Missing)	-0.370*** (0.075)	-0.253*** (0.066)	-0.246*** (0.066)
Age	-0.031*** (0.010)	0.024** (0.012)	0.020* (0.012)
Female	0.145*** (0.036)	0.140*** (0.030)	0.144*** (0.030)
SSE Score		0.012*** (0.002)	0.011*** (0.001)
Additional Controls †			
Hours Studied	Yes	Yes	Yes
Exam Score $\times$ Year	No	Yes	Yes
Exam Year Indicators	No	Yes	Yes
College Major	No	Yes	Yes
Parental Education	No	No	Yes
F-Statistics and p-values			
$H_o: (i)=\dots=(viii)=0$	6.56 (<.001)	1.68 (.099)	1.71 (.092)
$H_o: (i)=(ii)=(iii)=0$	16.91 (<.001)	3.49 (.015)	3.48 (.015)
$H_o: (iv)=\dots=(viii)=0$	2.59 (.024)	0.38 (.862)	0.16 (.978)
$H_o: (vi)=(vii)=(viii)=0$	2.66 (.047)	0.28 (.837)	0.08 (.970)
Observations	1,122	1,122	1,122
$R^2$	.129	.381	.384

NOTE. – The dependent variable is the individual GPA. Standard errors are given in parenthesis. The linearized standard errors are derived from a consistent variance-covariance matrix using Huber-White sandwich estimators. \*\*\*, \*\* and \* indicate respectively 1%, 5% and 10% significance levels. The indicator variables for the Business Administration Economics Combined Honors major and test year 2002 are omitted.

†See next page for the parameter estimates of these variables.

**Table 5 (continued)**

Independent Variables	GPA (Dependent Variable)		
	1	2	3
Hours Studied	-0.035 (0.087)	-0.044 (0.075)	-0.048 (0.075)
Hours Studied <sup>2</sup>	0.016 (0.017)	0.018 (0.014)	0.019 (0.014)
Hours Studied (Missing)	-0.029 (0.109)	-0.060 (0.096)	-0.059 (0.096)
Business Administration & Economics		-0.798*** (0.081)	-0.781*** (0.082)
Economics		-0.770*** (0.078)	-0.752*** (0.078)
Government		-0.548*** (0.096)	-0.540*** (0.097)
Economics (Honors)		0.235*** (0.077)	0.241*** (0.077)
International Finance		-0.804*** (0.076)	-0.793*** (0.077)
International Relations		-0.757*** (0.074)	-0.745*** (0.075)
Business Administration		-0.816*** (0.069)	-0.801*** (0.070)
SSE Year 2003		0.449 (0.379)	0.370 (0.378)
SSE Year 2004		0.191 (0.378)	0.102 (0.379)
SSE Year 2005		0.352 (0.503)	0.274 (0.498)
SSE Score× Year 2003		-0.006*** (0.001)	-0.006*** (0.001)
SSE Score× Year 2004		-0.005*** (0.001)	-0.004*** (0.001)
SSE Score× Year 2005		-0.005*** (0.001)	0.005** (0.002)
Father's Education			-0.003 × 10 <sup>-1</sup> (0.042)
Mother's Education			-0.008** (0.003)

**Table 6**  
**Marginal Effects after Multinomial Logit: The Determinants of Post-Graduation Plans (N=499)**

(Base Outcome=Plan to be an Employee)						
	Family Business	New Business	Employee→ Family Business	Employee→ New Business	Graduate School	Other
(i) SE <sub>father only</sub>	0.265*** (0.049)	0.005 (0.004)	0.071** (0.031)	-0.019 (0.012)	-0.103* (0.057)	-0.037* (0.027)
(ii) SE <sub>both parents</sub>	0.616*** (0.104)	-0.029*** (0.009)	0.148 (0.097)	-0.212*** (0.021)	-0.367*** (0.051)	0.004 (0.022)
Age	-0.008 (0.011)	-0.004** (0.002)	-0.016 (0.010)	0.001 (0.005)	0.015 (0.019)	-0.002 (0.003)
Female	-0.078** (0.032)	-0.008* (0.004)	-0.020 (0.025)	-0.008 (0.013)	0.039 (0.053)	-0.003 (0.012)
Income/1,000	0.0009*** (0.0002)	0.0002 (0.0003)	0.0002 (0.0002)	0.0003 (0.002)	-0.0004 (0.0005)	-0.0003** (0.0001)
SSE Score	-0.008*** (0.002)	-0.0008*** (0.0003)	-0.003*** (0.001)	-0.0005 (0.0008)	0.011*** (0.003)	-0.001 (0.008)
Year 2003	-0.539** (0.280)	-0.177 (0.233)	-0.015 (0.035)	-0.029 (0.038)	0.962*** (0.045)	-0.023 (0.041)
Year 2004	-0.283 (0.241)	-0.221 (0.313)	0.035 (0.024)	-0.077 (0.089)	0.530 (0.633)	-0.094 (0.132)
Year 2005	-0.339** (0.160)	-0.021 (0.027)	-0.095 (0.084)	-0.043 (0.038)	-0.115 (0.476)	-0.147 (0.164)
SSE × Year 2003	0.007*** (0.002)	0.0007** (0.0002)	0.002 (0.002)	0.006 (0.009)	-0.012*** (0.003)	0.001 (0.001)
SSE × Year 2004	0.005** (0.002)	0.0007** (0.0003)	0.001 (0.001)	0.008 (0.009)	-0.007* (0.004)	0.001 (0.001)
SSE × Year 2005	0.006*** (0.002)	0.0005 (0.0003)	0.002* (0.001)	0.003 (0.009)	-0.006* (0.003)	0.001 (0.001)
$\chi^2$ (Pr> $\chi^2$ )	23,806 (<.001)					
Pseudo R <sup>2</sup>	.152					
Log Pseudolikelihood	-727.35					
$\chi^2$ Stat for (i)=(ii)=0 [degrees of freedom] (Pr> $\chi^2$ )	17,600 [12] (<.001)					
Choice Spec. $\chi^2$ Stat [degrees of freedom] (i)=(ii)=0 (Pr> $\chi^2$ )	53.94 [2] (<.001)	4157.06 [2] (<.001)	19.48 [2] (<.001)	3,575 [2] (<.001)	4.03 [2] (.133)	3.80 [2] (.149)
Hausman Tests Of IIA Assumption H <sub>0</sub> =Odds (Outcome-J vs Outcome-K) are Indep. of Other Alternatives						
	$\chi^2$	df.	(P > $\chi^2$ )	Evidence		
Work in the Family Firm	.000	2	>.999	for H <sub>0</sub>		
Start a New Firm	.000	1	>.999	for H <sub>0</sub>		
Employee→Family Firm	.000	2	>.999	for H <sub>0</sub>		
Employee→New Firm	.000	1	>.999	for H <sub>0</sub>		
Graduate School	.000	2	>.999	for H <sub>0</sub>		
Other	.000	2	>.999	for H <sub>0</sub>		
Work as an Employee	.000	2	>.999	for H <sub>0</sub>		

NOTE. – Standard errors are given in parenthesis. The linearized standard errors are derived from a consistent variance-covariance matrix using Huber-White sandwich estimators. \*\*\*, \*\* and \* indicate respectively 1%, 5% and 10% significance levels. The indicator variable for test year 2002 is omitted. The results reported for the multinomial estimations are marginal effects rather than coefficients.

**Table 7**  
**The Determinants of Entrepreneurial Intent Corrected for Survey Non-Response Bias:**  
**Marginal Effects After Maximum Likelihood Probit Model with Sample Selection**

	Model 1			Model 2		
	Pr(Surveyed)	Pr(First-Degree Entrepreneur)		Pr(Surveyed)	Pr(First-Degree Entrepreneur)	
		Not Corrected	Corrected		Not Corrected	Corrected
Current Course Load	0.089*** (0.026)			0.090*** (0.027)		
(1 ≤ SE <sub>Parent</sub> )	-0.201* (0.122)	0.262*** (0.057)	0.346** (0.142)			
Female × (1 ≤ SE <sub>Parent</sub> )	-0.178 (0.158)	-0.023 (0.063)	-0.023 (0.094)			
SE <sub>father only</sub>				-0.267** (0.116)	0.273*** (0.064)	0.354** (0.162)
SE <sub>both parents</sub>				0.153 (0.268)	0.595*** (0.137)	0.594*** (0.159)
Female × SE <sub>father only</sub>				-0.089 (0.163)	-0.020 (0.064)	-0.026 (0.092)
Female × SE <sub>both parents</sub>				-0.518 (0.495)	-0.056 (0.098)	-0.062 (0.169)
Average Course Load	-0.177*** (0.041)	-0.018 (0.016)	-0.037 (0.430)	-0.182*** (0.041)	0.017 (0.015)	0.035 (0.047)
Age	0.058** (0.030)	-0.026** (0.011)	-0.040 (0.028)	0.057* (0.030)	-0.024** (0.011)	-0.038 (0.031)
Female	0.493*** (0.107)	-0.094* (0.053)	-0.160 (0.152)	0.466*** (0.105)	-0.089* (0.052)	-0.149 (0.157)
SSE Score	-0.002 (0.004)	-0.009*** (0.002)	-0.014*** (0.005)	-0.002 (0.004)	-0.010*** (0.002)	-0.014** (0.006)
Year 2003	0.451 (0.935)	-0.757*** (0.172)	-0.866*** (0.170)	0.501 (0.923)	-0.799*** (0.156)	-0.891*** (0.155)
Year 2004	-0.756 (1.03)	-0.566** (0.230)	-0.689*** (0.266)	-0.766 (1.03)	-0.591** (0.233)	-0.705*** (0.270)
Year 2005	-0.366 (1.23)	-0.362** (0.146)	-0.415 (0.276)	-0.334 (1.23)	-0.404*** (0.155)	-0.431 (0.296)
SSE × Year 2003	0.0004 (0.0004)	0.009*** (0.002)	0.012** (0.005)	0.0004 (0.004)	0.009*** (0.002)	0.012** (0.005)
SSE × Year 2004	0.005 (0.005)	0.007*** (0.002)	0.010** (0.004)	0.005 (0.005)	0.007*** (0.002)	0.010** (0.004)
SSE × Year 2005	0.006 (0.005)	0.007*** (0.002)	0.009** (0.003)	0.007 (0.005)	0.007*** (0.002)	0.010** (0.004)
Number of Obs.	1,108	485	1,108	1,108	485	1,108
Censored Obs.	623		623	623		623
Uncensored Obs.	485		485	485		485
Log pseudolikelihood	-891.1	-191.3	-891.1	-885.2	-186.2	-885.2
$\hat{\rho}$ (std. err.)	-0.323 (0.703)			-0.303 (0.766)		
Wald Test for Indep. Eqns. ( $\rho = 0$ ) $\chi^2(1)$ ( $p$ -value)	.18 (.66)			.14 (.71)		
$\chi^2$ -Stat for SE Parent Dummies ( $p$ -value)					31.77 (<.001)	32.81 (<.001)
$\chi^2$ -Stat for SE Parent Dummies × F ( $p$ -value)	57.23 (<.001)	43.45 (<.001)	57.23 (<.001)	64.52 (<.001)	53.08 (<.001)	64.52 (<.001)

NOTE. – Standard errors are given in parenthesis. The linearized standard errors are derived from a consistent variance-covariance matrix using Huber-White sandwich estimators. \*\*\*, \*\* and \* indicate respectively 1%, 5% and 10% significance levels. The indicator variable for test year 2002 is omitted. The results reported for the entrepreneurial intent equation estimations are marginal effects rather than coefficients, while the results for the survey response equation are the coefficients after probit estimation.