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**The Effects of Study Abroad and Personality
On Employment and Earnings in Mexico**

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**The Effects of Study Abroad and Personality
On Employment and Earnings in Mexico**

by

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Dissertation

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Dedication

This work is dedicated to the memory of my great-grandparents, Ignatz and Eva Palifka, who were illiterate immigrants.

I dedicate it also to my grandparents, George and Helen Palifka, and Everett and Flora Blake, as well as my late great-uncle, Joseph Hajkowski, who have been my inspiration.

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**The Effects of Study Abroad and Personality
On Employment and Earnings in Mexico**

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Supervisor: Daniel Hamermesh

Three essays address the effects of study abroad and personality on earnings and employment. Study abroad has not been included in previous studies of earnings, nor in models of the transition from school to work. Previous personality studies have not included both self-assessments and employer assessments of traits. I demonstrate the importance of study abroad and language on earnings, employment, and employment hazards; I also show that self-assessments and supervisor evaluations of an employee's personality differ and may have distinct coefficients in estimated regressions of earnings and occupation. This is also the first examination of the transition from college to work, and of the effects of personality on earnings and occupation, for Mexico.

In the first essay, a hazard model measures the effects of study abroad, extracurricular activities, and college grades on the transition from college to work for recent graduates of a Mexican university. While study abroad is associated with lower employment hazard rates and higher starting wages, the opposite is true of extracurricular activities. College grades increase the employment hazard but have no significant impact on wages.

The second essay examines the long-term impact of study abroad on the earnings of Mexican professionals, concluding that completion of a graduate degree abroad contributes significantly to earnings, beyond the language benefits of study abroad. Other forms of study abroad have varying effects depending on place of residence and ability. Study abroad before high school contributes to the probability of studying abroad later, of pursuing higher degrees, and of being employed at any given time.

The third essay compares self-evaluations and supervisor assessments of eleven personality traits and determines the importance of each trait for earnings and promotions. The intra-occupation variance of earnings is not well explained by personality traits, but responsibility is associated with promotion to higher positions.

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Chapter 1

Introduction

The study of human capital began over forty years ago. The first major treatise on the subject, Becker's *Human Capital* was published in 1964 and is still in print; his 1967 Woytinsky Lecture (now incorporated in *Human Capital*) laid out a basic theory of investment in human capital as a lifetime-utility-maximizing activity. In the decades since then, thousands of articles have been published on various aspects of human capital. These studies cover many countries and sub-sets of populations. They use varying methodologies and sets of variables. Yet none of them has addressed the questions raised in the essays that comprise this dissertation.

The first two essays examine the economics of study abroad. The decision to emigrate temporarily as part of the schooling sequence should influence both subsequent wages and the employment success rate. There are two reasons to believe so. First, study abroad contributes not only to language skills (in the event that the foreign country uses a different language than the native country), but also to general personal skills and comprehension as cultural differences are confronted and overcome. These are especially important if the second language is English and the native country is intimately tied to the global economy. Second, if it were not true, then study abroad would not be justifiable from a cost-benefit point of view. If the main purpose of study abroad were tourism, for example, and income benefits were not important, then it would be more rational simply to take vacation time abroad, without the pressure of school.

Foreign human capital has never been examined in this context. Certain studies (Chiswick, 1978; Friedberg, 2000) have estimated the value of foreign human capital in the context of immigration, which introduces many other factors. For example, a recent immigrant has not only foreign studies, but also foreign ideas about the way things work. Thus, the value assigned to foreign human capital in these studies captures also relative ignorance about how to find a job, what local wages are considered “fair”, and how to negotiate higher wages or better conditions. Unless the immigrant’s native language is the same as the one spoken in the adopted country, communication skills are also at play. In many cases, degrees earned in the country of origin are not recognized locally. All of these factors contribute to the low value placed on foreign relative to domestic human capital in these studies.

Only one study (Grubel and Scott, 1966) has estimated the “value” of study abroad—by using cost as a proxy. As the authors assert:

There seems to be widespread agreement about the range of benefits accruing to the individual students, to the academic host institutions, and to the participating countries through the exchange programs. The student’s intellectual development is promoted by his contact with foreign cultures, his new social environment, and the instructional variety. The social and intellectual life on the campuses receiving foreign students is stimulated, which in turn enriches the educational experience of the domestic students. The countries from which the students come benefit both from the general development of the students and from the special skills they acquire. And, finally, the transfer of knowledge and of techniques of teaching and research made possible by the exchange programs may be very important in the development of countries now engaged in efforts of industrialization. (Grubel and Scott, 1966: 81-82)

The purpose of that study was to evaluate the United States’ participation in study abroad programs through cost-benefit analysis. Their conclusion was that the United States had gained on balance through study abroad programs. Due to the nature of the

study, the authors used macroeconomic aggregates in the analysis, focusing on the participating countries. In my work, I have chosen to focus on the individuals, using microeconomic analysis.

The third essay is concerned with a very different aspect of human capital: personality. We are accustomed to thinking of human capital as education or training, but personality is also a type of human capital. Like education, certain personality traits, such as motivation, can influence productivity. Other traits, such as open-mindedness, increase the efficacy of education, just as formal education and other types of training can complement each other. Thus, to the extent that personality may be learned (the nature-or-nurture debate is beyond the scope of this study), it is clearly a type of human capital.

The psychology literature has provided us with many studies of personality and labor market outcomes; a few studies by economists have been published recently. Each of these relies on a single evaluation of certain traits. Almost always, the traits are self-assessed; on occasion professional evaluations are used. Employer assessments of employees' personality characteristics have never been used. The assumption that employees' self-assessments explain their wages well is a strong one. It is more feasible that employers' valuations of the employees' personalities have an impact on earnings, if these characteristics are valued. Better yet, we should test both self-assessments and employer assessments to determine which better explains wages.

My essay is unique for two reasons. First, it compares self-assessments with employer assessments of the employee's traits, demonstrating that self-assessments are not a good proxy for employers' perceptions of the employee. Second, the country of interest is Mexico.

1.1 Summary

Chapter 2 of this dissertation examines the impact of college study abroad, grades, and extra-curricular activities, in the transition from school to work for recent college graduates. I use surveys applied six months after graduation to alumni of a Mexican university to estimate the marginal impact of the three variables of interest on wages at six months and on the employment hazard. I find that study abroad contributes positively to the earnings of graduates, except in the case of engineering majors, and negatively to the hazard rate. This combination suggests that those who study abroad have high reservation wages. Participation in extra-curricular activities is associated with a higher employment hazard and wages that are not significantly lower than others' earnings. College GPA has a small but significant positive impact on the hazard rate, while high school GPA has a slightly larger, significant negative effect on the same; neither influences wages significantly. Women enjoy greater benefits from higher grades than do men, especially within the sub-sample of those who are hired sometime after graduation.

Chapter 3 is a study of the impact of various types of study abroad on medium- and long-term earnings. Using long-term surveys of alumni from the same Mexican university, interviewed two, twelve, or twenty-two years after graduation, I apply a standard semi-log wage estimation with study abroad included. The data include study abroad before high school, during high school, during college, and for graduate school (usually an entire graduate degree); foreign language or training courses (generally pursued after undergraduate studies have been completed); and work abroad. In addition to dividing the sample into the most recent graduates and the previous classes, I estimate

the effects of study abroad and language proficiency on earnings in the three largest cities and in the rest of the country.

I find that study abroad does contribute to higher earnings in both the medium term and the long run. The various types of study abroad, however, have differing effects in the medium and long run, and depending on whether the graduate lives in one of the three largest cities or elsewhere in Mexico. For example, English proficiency contributes to higher long-term earnings in the cities, but not in the rest of Mexico, while short-term earnings seem unaffected by language skills (perhaps because there is less variation in English fluency among more recent graduates). In general, more able students benefit more from academic study abroad than do less able students, while the opposite is true of work abroad and language or training courses. I also find that those who study abroad early in life are more likely to participate in study abroad later. It is unclear whether this is because a taste for foreign cultures is acquired or because language skills facilitate later study abroad. Study abroad before college has a positive effect on the pursuit of higher degrees, while college study abroad has the opposite effect. Early study abroad is also associated with a lower probability of post-college unemployment.

Using yet another long-term survey of graduates from the same Mexican university, in Chapter 4 I compare employee and supervisor responses to questions about eleven personality traits relating to the employee. No other study has done this in any country. I find that, for most of the traits, the evaluations do not coincide. In addition, there is serious self-selection on the part of employees: those who failed to answer the personality questions were more likely to receive low marks from their supervisors.

These findings call into doubt the results of studies that rely on self-evaluations to estimate the value to employers of given personality traits.

In addition, I measure the marginal effects of each trait, as assessed by the employee and the supervisor, on earnings and promotions. While the traits generally have little or no impact on earnings (while controlling for job title), responsibility is positively associated with climbing the corporate ladder for both genders. In gender-specific regressions, different assessments are significant for each gender.

1.2 Data

The data used in this study are unique. They have been gathered by a Mexican university and provided to me for exclusive use, on the condition that the secrecy of the source be maintained. Prior to this study, the data had been used only for internal reports. I have found no other Mexican survey containing the information of special interest for this study.

Chapter 2 employs data from three consecutive surveys applied six months after graduation, to the classes of May 2000, December 2000, and May 2001, respectively. This data was matched to registrar data consisting of college GPA, high school GPA, and the results of college entrance exams. The original intent was to use the entrance exams as a proxy for ability, but a lack of observations resulted in using high school GPA instead. The surveys themselves are rich in information, enabling the hazard estimation.

Chapter 3 uses a long-term survey applied in 1998 to the classes of 1976, 1986, and 1996. Unfortunately, registrar data was available for only a small subset of the

observations, so it was implausible to use registrar data in this analysis. The detailed information on study abroad makes this data especially appropriate for use in this chapter.

Chapter 4 takes advantage of another long-term survey, applied in 1992 to the classes of 1970, 1980, and 1990. This was the first such survey and the most extensive. Not only did it include the questions concerning personality, but follow-up surveys of supervisors contained the same questions about the employee's personality. It is unclear why the questions were included, but they offer an irresistible opportunity to compare employer and employee responses to questions about the employee's personality, and the marginal effect of each on employee success.

Chapter 2

Grades, Extra-curricular Activities, and Study Abroad in the Transition from School to Work for Mexican College Graduates

2.1 Introduction

The search for employment is always wrought with uncertainty; this is especially true for first-time job-seekers. Recent or soon-to-be college graduates face more anxiety than most because they hope to reap the benefits of their educational investment. Although some pursue higher education reluctantly, the conventional wisdom holds that a college education leads to better employment opportunities. Yet graduates know that, even within this elite set of job opportunities, they face competition from their own classmates and graduates from other universities.

Some students try to improve their own competitive position before graduation. Grade point average is one of the “objective” measures that students have been told is important for future success. Participation in extracurricular activities, claim some, is even more important than GPA. In addition, many students believe that study abroad will distinguish them from others and, thus, make them more desirable as employees. This is especially true in Mexico, where globalization has taken center stage in both the economy and educational goals, leading students to believe that first-hand knowledge of foreign cultures and languages may be valuable to employers.

The purpose of this essay is to determine the extent to which these three personal characteristics—grade point average, participation in extra-curricular activities, and study abroad—contribute to higher starting wages and shorter job search spells for recent

graduates. I use survey data complemented with official registrar data, in a Cox proportional hazards model. In my model, the hazard measures the marginal effect of a variable on the probability of being hired: a coefficient greater (less) than unity signifies that a person with the corresponding characteristic is more (less) likely to be hired at any given time than one without that characteristic.

The results are mixed. Among those hired within six months after graduation, GPA has a significant impact on the employment hazard for women only, but when those still unemployed at six months are included, GPA becomes insignificant even for women. The same pattern holds for participation in extra-curricular activities. Those who studied abroad have marginal hazard rates between 50% and 67% below their stay-at-home classmates but tend to have higher starting wages.

The essay proceeds as follows. Section 2.2 provides background information on higher education in Mexico; in Section 2.3 I define the model; Section 2.4 explains the data used; Section 2.5 provides results; conclusions and extensions are presented in Section 2.6.

2.2 Background

College education in Mexico differs from that of the United States. Mexican students take proportionally more courses in their respective fields than do American students. In addition, at the university that conducted this survey, the average course load is six courses per semester and the normal program of study is nine semesters long. I believe that the reasons for these differences have to do with the needs of each market. While in the United States a flexible (i.e., “well-rounded”) worker is required, in Mexico

a college graduate should be a specialized professional: with only 13% of the adult population studying beyond high school¹ and nearly 19% of the employed working in jobs that generally require a college degree in developed countries,² it is unfeasible to restrict positions requiring specialized learning to those with post-graduate degrees.

In recent years, both English language fluency and international expertise have become increasingly important in the curricula of Mexican universities. By design, then, graduates are already prepared for a global labor market. Why should qualitative measures such as GPA or “distinguishing” experiences such as study abroad matter? I leave this question for the discussion below.

2.2.1 Scholarships and search intensity

Two broad classes of students can be identified in this sample: scholarship recipients and the children of wealthy families. Although there are exceptions, in general the scholarship recipients are more motivated to study, either because they have already developed good study habits (which earned them the scholarships) or because continued scholarship support depends on it.

The distinction between these two groups is important because, just as the scholarship recipients are more motivated to study, they also have stronger incentives to

¹ According to the 2000 Census, 13% of those aged 18 and older had studied at least one year of college; 7% had completed four years or more of higher education; and 0.68% had studied at the post-graduate level. Among 22-to-24-year-olds, 15% had studied some college; 8% had completed four years or more. The data do not indicate degrees completed. Data from *XII Censo General de Población y Vivienda 2000: Tabulados Básicos Nacionales y por Entidad Federativa; Base de Datos y Tabulados de la Muestra Censal* (CD-ROM); my calculations.

² My calculations from *Ibid.* I defined the category “jobs that generally require a college degree” to include: professionals, educational workers, directors and functionaries, administrative supervisors, and office assistants. By the same data, 48.7% of the population aged 12 and over (or 98.8% of the labor force) was employed at the time of the census.

seek intensively and accept job offers before or shortly after graduation.³ There are two main incentives: first, family resources tend to be lower for this group than for the other group of students; second, most of the scholarship recipients must repay at least part of the scholarship. Thus, most scholarship recipients face a post-graduation budget constraint that exacerbates the incentive for intensive search. On the other hand, non-recipients may have more family connections that enable them to enter employment with less intensive job search. Thus it is worthwhile to identify these groups in the estimation process.

2.2.2 Search Technologies

The university offers a student job placement service and job fairs. Graduating seniors and alumni can register their CVs online and check job postings at the same site. Firms especially interested in these graduates should look there first.

Every year, a job fair brings dozens of domestic and international recruiting firms to the university. Students and alumni meet with the firms that are interested in their majors. The organizers publish a list of firms and the majors they are interviewing.

Personal contacts are very important. Due to institutional limitations, conventional wisdom holds that good credentials are often less valuable than having a “sponsor” either inside the firm or with close contact to those in charge of hiring.

2.2.3 Study Abroad

The university participates in foreign exchange programs with many colleges and universities around the world. Students participating in these programs pay the home

³ There are three types of scholarship: merit-based, needs-and-merit-based loan-scholarship, and needs-

institution's tuition rate, so the only increased cost is that implied by airfare and, for students who ordinarily live with their parents, the cost of living. I assume that any tourist-type spending is associated with the utility derived from the tourist aspect of being abroad. There is also a psychic cost of being far from home in a strange culture. These costs are borne, in part, for the sake of expected returns after graduation. Students who go abroad during college hope to differentiate themselves from those who stay home.

Studying a semester or more in a foreign country is a better indicator of language ability than the TOEFL. While formal exams measure reading and writing capabilities, living in a foreign language requires oral communications skills not included in the TOEFL. These are the very skills that most globally-oriented firms want.

Because most college study abroad programs set minimum GPA standards, there may be some correlation between these two variables.

2.2.4 Theses and "Plans"

Some majors require a thesis or final project to be completed before graduation. As a result, the graduation date may be long after the last class was taken and the age and experience of recent graduates may vary widely.

The curriculum of each major is tightly defined, with few elective courses. The curriculum is revised every several years and a new "plan" is issued and registered with the Mexican government. Students are subject to the "plan" that is in place at matriculation, but may choose to switch to a newer plan if they take any newly imposed

based loan, each with its own minimum GPA requirement.

early-semester courses. Thus, students of a given major under a given plan at the same university have received near-identical university education.

2.3 The Model

2.3.1 Search Theory

The origins of search theory can be traced to George Stigler's (1961) seminal paper, part of a debate over the importance of information or the lack thereof. Stigler lays out the basics of search theory in a market, assuming perfect information about price distributions but random draws from that distribution at any point in time. Price dispersion arises from search costs. He leaves uncertainty and ignorance about price distribution shape for further research.

Empirical applications of the theory have followed Stigler fairly closely, dealing with real-data problems such as censoring, the shape of the distribution, and panel vs. cross-section results. Uncertainty has been included along the way.

In the basic job search model, the job-seeker makes contacts with random firms, sampling from a known wage distribution. In the empirical literature, the wage distribution is almost always assumed to be normal or log-normal. The contacts are usually made serially. In standard models, the observed wage is compared to a "reservation wage"; the job is accepted if the observed wage exceeds the reservation wage. In optimal stopping models, the job-seeker continues to look as long as the expected returns to search are positive, and the reservation wage may adjust as new information is obtained.

Warner *et al.* (1980: 214) sum up the problem nicely. "To leave unemployment, a job-seeker must first locate a firm with a job vacancy, must then have the firm extend a

job offer, and then must accept that offer. Thus, an explanation of the duration of completed unemployment must account for all three events.” The duration in unemployment depends on three factors: job search intensity (which determines the probability of locating a job vacancy), relative competitiveness (which contributes to both the probability of receiving an offer and the size of the offer), and the seeker’s reservation wage (which decides whether the offer will be accepted or not).

2.3.2 Model

Technically, the duration of unemployment, the accepted wage, and work hours are determined simultaneously, which suggests a simultaneous equations approach,⁴ but few authors have used simultaneous equations, preferring to estimate wages and unemployment duration separately, while eliminating the hours problem altogether by considering only full-time workers. For example, Eckstein and Wolpin (1995) and Wolpin (1987) characterize only full-time jobs as “real” jobs, discarding the possibility that a person might choose to work part-time. I include part-time workers; weekly hours is one of the covariates.

Since the data were collected just six months after graduation, multiple spells are not observed. Although the use of multiple spells is interesting and allows for the inclusion of fixed effects, it is not always possible or desirable. Eckstein and Wolpin (1995) and Wolpin (1987) study the first post-graduate unemployment spell, that is, the time from graduation to employment. These studies, however, are concerned with high

⁴ See, for example, Lancaster (1985). The limitations mentioned in the final paragraph of Lancaster’s paper are most likely the reason so few economists have used this approach.

school graduates in the National Longitudinal Survey, while mine covers college graduates in Mexico.

For this study, I use a single-spell Cox proportional hazard model with time-invariant covariates⁵; wage regressions are estimated separately. The basic model is of the form:

$$h_i(t) = h_0(t) \exp(\mathbf{X}_i' \boldsymbol{\beta}) \quad (2.1)$$

where

$h_0(t)$ represents the baseline hazard of being hired

\mathbf{X}_i is a vector of individual-specific covariates (described below)

Assumptions:

1. Students have no work experience other than that reported in the survey (employment before graduation).
2. Non-wage job-related benefits and amenities are proportional to wages and firm size.
3. No one is married. Marital status is not included in the survey. Although some female graduates indicate rejecting job offers due to marriage or pregnancy, I will assume that marriage does not exist or is not important for this group. Given the results of many income studies, this may be a strong assumption.
4. Sub-markets are defined by majors. That is, competition for jobs occurs within majors, not among majors. Since the survey does not include occupation, this is a second-best option.

⁵ The exact marginal method (`exactm` in *Stata*) was used for ties.

Covariates of special interest to this study:

Students are taught that grades are important for employability. Insofar as college grades reflect ability and motivation, and these two characteristics are desirable to employers, it is reasonable to expect that those with higher grades will have higher offer probabilities and draw from somewhat higher earnings distributions. One purpose of this study is to determine whether, in fact, a higher GPA results in a higher employment hazard for recent graduates. While higher GPA may increase offer probability, it may also be associated with a lower acceptance probability, if students with higher grades overestimate their worth and thus set reservation wages too high initially. McCall (1970) finds that those who over-estimate their own value will search longer, and vice-versa.

Extra-curricular activities, too, are said to increase employability. Students in these activities not only demonstrate an ability to work as part of a team, but also develop personal connections that may help them to obtain employment. If teamwork is a valued skill, then these graduates may enjoy higher offer probabilities or draw from a higher wage distribution. If connections matter, then those developed in these activities may also improve the graduate's offer probability. On the other hand, participation in extra-curricular activities is often incompatible with employment during school,⁶ so participants might have less pre-graduation experience than non-participants have.

Study abroad ostensibly makes a student more interesting, open-minded, knowledgeable and, therefore, employable. Graduates who studied abroad should receive more offers sooner. This does not, however, necessarily imply a higher hazard: these

graduates may choose to take time after graduation to return to the country of study, or may have higher wage expectations and therefore reject more offers.

Standard covariates:

Women are expected to have a lower offer probability, but be more likely to accept a given offer and be more responsive to increments in offers. The first effect should result in a coefficient on **female** less than one. To test for the second effect, I interact this dummy with the income variable, expecting a coefficient greater than one.

While older graduates are more likely to work during college, those who did not may face discrimination or may be valued for their relative maturity. Therefore, I expect a higher age to affect the hazard positively for the full sample, but I have no prior expectation for the sample that excludes those who were working at graduation.

Pre-graduation experience should increase the hazard rate, if only because many of these students continue to work for the same employer after graduation. In the sample of students who were not working at the time of graduation, this experience should help them to get a job more quickly. Light (2001) demonstrates the importance of such experience in wage equations.

Accepted monthly compensation can have contradictory effects on the hazard. The higher the offered wage, the greater the probability of its being accepted. Sometimes, however, the accepted wage comes only after rejecting several offers. Since the data do not include all offered wages, but only the accepted wage, it is difficult to predict the magnitude of this coefficient.

⁶ Approximately 42% of respondents both worked and participated in extra-curricular activities; 10% did

Part-time workers may take these part-time jobs as a last resort, after failing to find a full-time job. If this is the case, the coefficient on hours worked should be smaller than one.

The number of offers rejected is a proxy for both search intensity and offer probability. The higher the search intensity and offer probability, the higher should be the hazard. Therefore, the coefficient on this variable should be greater than unity if it is a good proxy.

Search method has been included in at least two studies. Holzer (1987) found only newspapers significant at the 90% level for accepted wages. Warner, *et al.* (1980) found that search method had no significant influence on hazard rates. Anecdotal evidence holds that personal references are very important for first-time job-seekers in Mexico, indicating that the coefficient on finding a job through family or friends should be greater than unity.

Firm size may reduce duration, if larger firms take advantage of the university-sponsored job fairs and placement service.

Labor market variables:

College major serves as a proxy for the sub-market and, by extension, for the “tightness” of this sub-market, since it is impossible to link unemployment rates to alumni. Labor market tightness is difficult to measure. Narendranathan (1993) uses local unemployment rates to represent market tightness. Unfortunately, for most observations in my sample, the current place of residence is missing. In addition, the global

neither; 39% participated in extra-curricular activities but did not work; 9% worked and did not participate

unemployment rate does not necessarily reflect that corresponding to college graduates; even among majors, there are varying degrees of competition. Therefore, my model does not account for labor market tightness beyond including a set of dummies corresponding to each major.

Mean income of previous or concurrent graduates in the same major serves as a proxy for reservation wage. The distribution of wages accepted by the graduates of a given major may also be considered an approximation for labor market demand. In addition, using these alternate definitions allows testing of rational vs. adaptive expectations in forming the reservation wage.

Scholarship recipients, as explained in Section 2.2.1, have strong incentives to search more intensively than have non-recipients. This higher search intensity should increase the employment hazard of scholarship recipients. However, non-scholarship recipients generally are from families with connections that scholarship recipients do not enjoy. These connections could annul the effects of higher search intensity. Scholarship recipients may have higher expectations, as well, thus reducing the probability of accepting an offer.

Other covariates:

Anecdotally, December graduates tend to struggle more to find a job, so I expect to find this in the data. I have no expectation for May 2001 graduates relative to May 2000 graduates.

in extra-curricular activities.

As proxies for innate ability, the survey offers two variables: high school GPA and the results of an admissions exam. I do not anticipate any significant influence of these variables in time to employment. I expect college GPA to be more important than High School GPA; the abilities measured on the admissions exam, although potentially important for lifetime earnings, do not necessarily contribute to landing the first job.

In general, the children of influential families attend private schools, so those who attended a public high school probably do not have the personal connections of their private-school peers. This would lead us to expect a coefficient smaller than one for this variable. On the other hand, wealthy students are more likely to take time off after graduation and search less intensively, as they have more family resources on which to rely. This factor has the opposite effect on the hazard rate. It is, therefore, difficult to predict the magnitude of this coefficient.

2.4 The Data

2.4.1 Database description

Although there are several sources of data covering Mexican labor force statistics, some of them very detailed, no national survey includes the three variables of special interest for this study: college GPA, participation in extra-curricular activities, and study abroad during college. At least one regional survey contains information on the completion of degrees outside Mexico, but the number of such observations is too small to allow for analysis. I know of no database, other than the one I use, with information on short-term study abroad. This database has been provided to me exclusively under the strictest confidence.

The main database is a survey applied to alumni of a Mexican university who graduated in May 2000, December 2000, and May 2001. The survey was conducted six months after graduation in each case. The resulting sample is highly homogeneous: those included not only have the same age and level of education, but are graduates of the same university. Differences in the quality of education are assumed to be minimal. Although birth dates cover a decade, over 85% of the graduates were born between 1976 and 1978. All remaining observed heterogeneity derives from student majors, GPAs, ability levels, and the types of positions sought.

The survey data were matched with official registrar data: college GPA, high school GPA, and college admissions exam scores. The admissions exam scores serve as an ability proxy that may be broken down into individual math and verbal scores. The indicator for public high school attendance (described in Section 2.3.2) was derived from high school names provided in the registrar data.

For the restricted sample, I dropped all observations who had no intention of working at graduation and who were out of the labor force at the time of the survey. In other words, I kept those who intended to work upon graduation and those who were working or seeking work at the time of the survey despite having no intention to work upon graduation. The restricted sample has 17 fewer observations than the original sample.

I hesitate to exclude the self-employed, even those who ran their own businesses before graduation, because some of them indicate a positive time to employment after graduation or a positive number of rejected job offers. Therefore, assuming that the self-employed do not engage in job search may be too rash.

2.4.2 Descriptive statistics

Table 2.1 summarizes the data for the sample, once those who had no intention to seek employment were eliminated. Sub-groups by foreign study and scholarship receipt are also presented. Although the differences among the means of these groups are not statistically significant, there is some evidence of self-selection into study abroad by women and students without scholarships; while scholarship recipients are somewhat more likely to participate in extracurricular activities. As expected, the mean GPA for scholarship recipients and those who studied abroad is slightly higher than for those in each “no” category.

Table 2.1. Descriptive statistics

Variable	Total	Studied abroad		Scholarship recipient	
		Yes	No	Yes	No
N	1375	167	250	346	931
% female	36.95	42.51	38.00	34.68	37.59
GPA	83.51 (5.56)	83.61 (5.31)	82.29 (5.08)	86.17 (5.07)	82.49 (5.32)
Job search duration (months)	2.68 (2.34)	2.47 (2.36)	2.58 (2.40)	2.58 (2.26)	2.68 (2.35)
Rejected offers (#)	2.32 (1.71)	2.52 (1.85)	2.58 (1.71)	2.35 (1.97)	2.29 (1.60)
Monthly earnings (1000s of pesos)	10.15 (5.3)	10.05 (4.48)	9.96 (5.92)	10.24 (5.68)	10.14 (5.25)
Extracurricular activities	81.3%	83.2%	82.0%	87.5%	79.1%
Studied abroad	40.0%			32.4%	41.7%

Note: Standard deviations in parentheses.

The average number of employment offers rejected masks the underlying dynamic. Of respondents, only 2% had rejected no offers, while 83% had rejected between one and three offers. Only 4% of respondents claimed to have rejected between six and fifteen offers. In some surveys, the reasons for having rejected offers were also provided. These are even more important when considering the search process: while 65% reported rejecting offers for salary reasons, 60% had already received a better offer

before the rejected offer and 66% were already employed when they rejected a new offer.⁷ Thus, a higher number of rejections may reflect more intensive job search or a higher offer probability, but we should not infer that all offers were made serially before the accepted offer.

2.4.3 Data Problems

2.4.3.1 Sample selection

I check for observable sample selection by using the data I have on all graduates for each semester, comparing distributions of GPA, majors, and entrance exams.

As is evident in Table 2.2, the sample represents approximately 40%, 25%, and 75% of the respective populations (42% overall) and closely mimics the descriptive statistics. Women seem to be under-sampled, but only slightly, in the first two classes, and somewhat over-sampled in the last. The GPA and exam means in the sample are similar to those in the population. The May 2000 and 2001 samples seem to be representative. The December 2000 data under-sample women and represent a much smaller proportion of the class than do the other two samples; it is unclear why this is. Although the means of the December 2000 sample are statistically close to the sample means, the differences are larger for this sample than for the other two samples.

⁷ Only 25% reported having rejected an offer on the basis of the work environment and 3% for “little room for growth”, while 44% had received and rejected offers for positions unrelated to their respective fields. Location was responsible for rejections according to 40% of respondents. 2% rejected offers due to marriage or pregnancy.

Table 2.2. Sample compared to underlying population

	May 2000		December 2000		May 2001	
	Population	Sample	Population	Sample	Population	Sample
N	1,082	407	1308	324	834	631
% Female	41.40	40.05	35.93	30.86	37.77	38.03
GPA	83.13 (8.25)	82.65 (5.17)	83.84 (7.09) [1308]	84.18 (5.82) [324]	83.59 (5.65) [833]	83.63 (5.61) [631]
Admissions exam	1307 (80) [536]	1292.495 (76.23) [198]	1311 (98) [618]	1319 (91) [147]	1302 (90) [453]	1305 (90) [333]
Math	687 (54) [536]	680.55 (54.63) [197]	684 (83) [618]	688 (74) [147]	689 (56) [452]	691 (55) [333]
Verbal	619 (57) [536]	612.26 (55.26) [197]	619 (84) [618]	629 (68) [147]	612 (61) [452]	613 (60) [333]
High School GPA	84.79 (8.23) [1048]	83.27 (7.30) [378]	81.38 (18.51) [1230]	83.52 (15.47) [296]	85.00 (8.09) [746]	84.95 (8.11) [586]

Note: Standard deviations are in parentheses; number of responses in square brackets when different from sample size.

2.4.3.2 Measurement error or mis-reporting.

I am especially concerned about over-reporting (bragging) in the data. Returns to education can be severely affected by this kind of measurement error. By comparing official GPA to the self-reported GPA, I found three patterns. First, self-reported GPA tends to be biased upward. Second, there is a positive relationship between the position within the range and the misreporting: those closer to the top are more likely to push the reported value to the next level. Third, the misreporting is somewhat less biased for those closer to the bottom of each range. Since I have no official information on the income or other employment variables, I cannot conduct such a test for those variables.

There is little, if anything, to be done about this problem. It is unreasonable to assume that the same individuals might bias income or employment reporting in the same way they bias GPA reporting. Neither is there any good instrument for either variable available in the data. I can only acknowledge that the problem exists. For GPA, I use the

official figure rather than the self-reported. Because there is evidence of reporting bias, all coefficients should be interpreted with caution.

2.4.3.3 Mis-specification

Entrance exam results are missing for over half of the observations. Only 205 of 424 respondents have admissions exam results. This makes inclusion of exam grades, a proxy for ability, impracticable. Therefore, other variables may capture the effects of ability.

Table 2.3 shows the distribution of those who worked before graduation and those who did not, and their time to employment after graduation. Although there does seem to be a correlation between working before graduation and the probability of employment at the time of graduation, I cannot simply assume that those who worked before continued in the same employment: over 60% of graduates with experience sought new employment upon graduation.

Table 2.3. Time to employment after graduation, by previous experience

Time to employment	Did not work before graduation	Worked before graduation					
		Total	Number of Months				
			1-6	7-12	13-24	25-36	>36
Had job at graduation	184 (30.92)	375 (38.34)	119 (41.90)	92 (45.10)	50 (51.02)	18 (62.07)	23 (69.70)
Less than one month	101 (16.97)	157 (16.27)	51 (17.96)	32 (15.69)	18 (18.37)	0	4 (12.12)
Between one and two months	64 (10.76)	95 (9.84)	29 (10.21)	23 (11.27)	6 (6.12)	2 (6.90)	0
Between two and three months	45 (7.56)	64 (6.63)	21 (7.39)	10 (4.90)	3 (3.06)	2 (6.90)	3 (9.09)
More than three months	201 (33.78)	279 (28.91)	64 (22.54)	47 (23.04)	21 (21.43)	7 (24.14)	3 (9.09)
Total	595 (100)	965 (100)	284 (100)	204 (100)	98 (100)	29 (100)	33 (100)

Note: distributions by previous experience are given in parentheses.

Tables 2.4 and 2.5 provide descriptive statistics by successful search method, pre- and post-graduation, respectively. Referral by friends and relatives is by far the most

common successful search method, comprising 47% and 38% of pre- and post-graduation hired students, respectively. The data cannot inform us whether this method is resorted to after trying other search avenues, or is the only search method used, but we can learn something about the students who ultimately find employment through family or friends. These students tend to have slightly lower grades and admissions exam results, and are less likely to be scholarship recipients, than average. Both earnings and time to employment rank in the middle for this search method before graduation; in post-graduation search, time to employment still ranks in the middle, but earnings rank second from the bottom.

Table 2.4 Personal characteristics by successful pre-graduation search method

	Placement	Job Fair	Professor Referral	Friends or Relatives	Sending CVs	Other
N	25	3	35	98	15	31
Income	11300 (7291)	10000 (.)	7905 (2998)	10613 (4771)	7818 (2089)	12308 (8152)
% Female	32%	33%	35%	33%	73%	23%
GPA	82.2 (5.4)	85.4 (4.3)	85.0 (5.5)	81.1 (5.3)	82.0 (4.6)	83.7 (4.9)
Admissions exam	1288 (77)	1285 (93)	1315 (104)	1284 (74)	1266 (82)	1308 (73)
Worked before	100%	100%	100%	100%	100%	100%
Months worked before	15.36 (15.36)	30.00 (26.15)	12.19 (7.01)	19.91 (15.20)	15.60 (14.31)	20.40 (16.94)
Time to employment	1.78 (1.38)	3.67 (2.31)	2.61 (1.80)	2.45 (1.72)	2.40 (1.80)	1.67 (1.30)
Scholarship	40%	0%	22%	12%	27%	23%
Study abroad	24%	33%	19%	46%	33%	48%
Extra-curricular activities	84%	100%	78%	86%	87%	87%
Private sector	100%	100%	95%	94%	100%	100%

Note: standard deviations in parentheses.

Table 2.5 Personal characteristics by successful post-graduation search method

	Placement	Job Fair	Professor Referral	Friends or Relatives	Sending CVs	Other
N	99	12	47	276	167	119
Income	10884 (5216)	14363 (8981)	9319 (4668)	9657 (4328)	10606 (5430)	10893 (7133)
% Female	31%	25%	43%	31%	39%	34%
GPA	84.6 (5.6)	85.8 (5.6)	85.6 (6.5)	82.6 (5.5)	84.1 (5.6)	82.5 (5.5)
Admissions exam	1322 (93)	1277 (67)	1329 (85)	1305 (81)	1316 (82.9)	1292 (92)
Worked before	72%	50%	74%	65%	66%	69%
Months worked	8.31 (10.66)	6.17 (7.98)	7.68 (8.90)	8.91 (12.22)	7.93 (11.43)	10.07 (12.01)
Time to employment	1.59 (0.86)	1.82 (1.25)	1.57 (0.90)	1.83 (1.05)	2.10 (1.12)	1.91 (1.35)
Scholarship	41%	55%	48%	23%	36%	19%
Study abroad	25%	N/A	0%	49%	32%	48%
Extra-curricular	83%	100%	83%	82%	84%	78%
Private sector	93%	91%	94%	91%	94%	99%

Note: Percentages indicate proportion of each search method group.

The Job Fair appears to have been relatively unsuccessful for these students, but it is possible that the students who made contact at the job fair reported a different method, such as “Sending CVs” or “Other”. For regression analysis, I will include the Job Fair with Sending CVs.

Although at first glance it appears that there is little difference in study abroad participation between those who found employment before and after graduation, this is a mirage. The response rate for study abroad ranged between 0% and 20% for all of the post-graduation sub-samples except “other”, in which 48 of 119 responded; if we interpret no response as “no” then the percentages for study abroad should be much lower for each search method in Table 2.5.⁸

⁸ For all other variables included here (except admissions exam results) the response rate was at least 90%.

2.5 Results

In addition to the hazard model described in Section 2.3.2, I estimated semi-log income equations.⁹ In the absence of data on reservation wages, combining the results from employment hazard and wage regressions allows us to make inferences about reservation wages.

2.5.1 Income

Because the hiring dynamic depends not only on receiving an offer, but also on accepting that offer, it is important to take accepted wages into account when analyzing the results of hazard regressions. Without knowledge of accepted wages, the hazards cannot be put into context. Accepted wages are used instead of reservation wages only because the latter are not available. The wage a given person accepts depends on his reservation wage and the distribution from which he draws offers.

The results of three income regressions are presented in Table 2.6.¹⁰ The first regression, which covers the most observations, is a control regression. The second regression includes extra-curricular activities but not study abroad, in order to use as many observations as possible in the analysis of these activities. The final regression includes both extra-curricular activities and study abroad; of necessity, the sample size is reduced because only the May 2000 survey included study abroad information.¹¹

⁹ The empirical analysis was carried out using *Stata 7*.

¹⁰ Search methods, firm size, and major had insignificant coefficients and did not improve the specification significantly. State of birth dummies yielded some significant coefficients, but observations were lost and the fit was not improved.

¹¹ A regression of controls only on this smaller sample yields coefficients that are not statistically significantly different from those on the entire sample.

Table 2.6. Income regressions

Variable	Control Regression		Extra-curricular Activities		Extra-curricular Activities and Study Abroad	
	Coefficient	P-value	Coefficient	P-value	Coefficient	P-value
Extra-curricular abroad	--		-.0542	0.264	-.0276	0.741
Business × abroad	--		--		.1952	0.053
Engineer × abroad	--		--		-.1419	0.395
GPA	.0060	0.103	.0053	0.149	-.0030	0.621
High school GPA	-.0016	0.591	-.0014	0.637	-.0034	0.382
female	-.2198	0.000	-.2237	0.000	-.1046	0.267
December 2000	.0713	0.086	.0709	0.087	--	
May 2001	.0459	0.286	.0439	0.311	--	
experience	.0011	0.976	.0008	0.982	.0496	0.452
months to hired	-.0389	0.010	-.0388	0.009	.0007	0.978
rejected offers (#)	.0297	0.007	.0289	0.008	.0373	0.015
hours	.0231	0.000	.0225	0.000	.0241	0.001
scholarship	.0402	0.341	.0481	0.256	.0453	0.476
Business	.0403	0.377	.0425	0.354	.0202	0.852
Engineer	-.0817	0.120	-.0742	0.165	.1114	0.293
family business	.0075	0.872	.0063	0.892	.0882	0.200
ave. income/major	.0001	0.000	.0001	0.000	.0001	0.000
Constant	.1381	0.680	.2682	0.432	.8014	0.285
N	490		487		163	
R ²	0.3402		0.3296		0.4692	
Ramsey RESET test	0.1426		0.2840		0.4128	

Notes: regressions run with robust variance to account for heteroskedasticity. Dependent variable is the natural log of earnings (thousands of pesos). Search methods and firm size were insignificant and had no effect on other coefficients.

While women earn less than do men, hours, the number of rejected offers, and the major-specific average wage (our proxy for demand in each sub-market¹²) each has a positive influence on earnings. Scholarship receipt and high school and college grades are insignificant as determinants of monthly compensation.

Participation in extra-curricular activities has a negative but insignificant impact on earnings. Thus, students who participate in athletics, cultural activities, and student

¹² The average of earnings from the previous semester's graduates in the same major was also tested, but was insignificant. This suggests that graduates were using rational, rather than adaptive, expectations.

politics, do not on average derive short-term wage benefits from their affiliation with these groups.

Participation in study abroad has a positive, significant relation with earnings. In fact, this is the largest significant coefficient in the regressions. The large, significant, negative coefficient on the interacted term **Engineer × abroad**, however, informs us that this benefit is not enjoyed by Engineering majors, despite the fact that Engineers are more likely to participate in study abroad programs specific to their field of study than are other majors.¹³ Although the coefficient on **Business × abroad** is negative, it is insignificant, leading us to the conclusion that Business majors benefit from study abroad as much as, or nearly as much as, Liberal Arts majors do.

The marginal effects on wages of both high school and college grades are insignificant. Generally, however, the coefficient on high school grades is negative, while that on college grades is positive. These signs are important for interpreting the employment hazard results.

In each of the first two regressions, the time to employment has a negative, significant impact on earnings. There are two possible interpretations for its sign: either the best candidates were hired early at relatively high salaries, or the graduates' reservation wages were initially too high and declined as information on the labor market was gathered through search. Since the coefficient on the number of offers rejected is positive and significant, the former interpretation is probably the more appropriate. In the final regression, which includes study abroad variables and is limited to the May 2000

¹³ Personal observation from records kept by the study abroad office of the school that provided the data.

sub-sample, time to employment has an insignificant effect on wages at six months after graduation.

2.5.2 Employment hazards

Using the Cox proportional hazards specification, I estimate the marginal effects on the hazard function of each covariate, using the exact marginal method for ties. All marginal effects on the hazard are reported as exponentiated coefficients (percentage effects on the baseline hazard). The corresponding p -value is presented below each coefficient.

Table 2.7 summarizes the results of estimating a set of control regressions, without study abroad or participation in extra-curricular activities.¹⁴ The marginal effect of each variable on hazard rates is reported for the full sample, by gender, and with or without search methods.

Although the coefficient on **female** is insignificant, the separate regressions for men and women reveal important differences. Experience, for example, is more helpful for male job-seekers than for female job-seekers, while women obtain greater benefits from a high GPA: an increase of one grade point improves the hazard by more than 5% for women, while the same variable is insignificant for men. Women also have a slightly higher coefficient on **income** than do men, confirming our expectation: increasing compensation by 1,000 pesos increases women's hazard by approximately three percentage points more than men's. In other words, women are more responsive to increases in pay.

Table 2.7. Control regression of employment hazards

Variable	All	Men	Women	All	Men	Women
N	524	348	176	524	348	176
female	1.1081 (0.341)	--	--	1.1397 (0.227)	--	--
experience	1.5494 (0.000)	1.5729 (0.000)	1.4559 (0.030)	1.5553 (0.000)	1.6304 (0.001)	1.3636 (0.102)
GPA	1.0267 (0.015)	1.0142 (0.293)	1.0544 (0.007)	1.0235 (0.035)	1.0093 (0.500)	1.0505 (0.017)
high school GPA	.9722 (0.000)	.9687 (0.001)	.9835 (0.290)	.9701 (0.000)	.9664 (0.001)	.9810 (0.234)
scholarship	.8383 (0.147)	.9732 (0.852)	.5706 (0.013)	.8678 (0.254)	.9965 (0.981)	.6451 (0.031)
December 2000	.5270 (0.000)	.5111 (0.000)	.5985 (0.033)	.5410 (0.000)	.5097 (0.000)	.6451 (0.082)
May 2001	.6516 (0.000)	.6766 (0.008)	.6749 (0.041)	.6746 (0.001)	.6862 (0.012)	.7296 (0.128)
rejected offers (#)	1.0814 (0.002)	1.0728 (0.014)	1.0622 (0.322)	1.0844 (0.001)	1.0701 (0.018)	1.0731 (0.251)
income (thousands)	1.0349 (0.002)	1.0264 (0.033)	1.0564 (0.057)	1.0406 (0.000)	1.0330 (0.009)	1.0600 (0.047)
hours	.9836 (0.038)	.9766 (0.033)	.9914 (0.478)	.9903 (0.238)	.9815 (0.108)	.9963 (0.772)
public high school	1.5757 (0.002)	1.5902 (0.013)	1.5342 (0.117)	1.5765 (0.003)	1.5640 (0.020)	1.5945 (0.101)
Search Methods						
placement	--	--	--	1.1740 (0.317)	1.1000 (0.627)	1.2673 (0.437)
job fair	--	--	--	1.2945 (0.545)	1.1867 (0.717)	6.1227 (0.095)
professor	--	--	--	1.2945 (0.009)	1.3745 (0.335)	2.0303 (0.028)
friends	--	--	--	.9746 (0.829)	.9916 (0.955)	.9815 (0.933)
resume	--	--	--	.6448 (0.001)	.5605 (0.000)	.8577 (0.490)
Pr(> χ^2)	0.0000	0.0000	0.0018	0.0000	0.000	0.0021
Log Likelihood	-849.75189	-517.0041	-242.23722	-837.3306	-507.34787	-238.47755

Note: p-values in parentheses.

The high school GPA result is surprising and puzzling: *ceteris paribus*, students with higher high school grades take longer to find a job after college; this result is stronger for men than for women. Perhaps higher grades in high school reflect or cause high expectations: within a given college GPA range, those with higher high school

¹⁴ Age, firm size, job title, and mean compensation by major were found to be insignificant and are therefore excluded from the estimation.

grades set high reservation wages and must adjust them downwards as they learn more about the labor market.¹⁵ The negative coefficients on high school GPA in the wage regressions (Table 2.6) support this theory.

Interestingly, those who attended public high schools are hired sooner than are those who attended private high schools. There are at least three possible explanations for this. These graduates may be highly motivated and demonstrate this characteristic in job interviews, leading to a higher job offer probability. Alternatively, as they have fewer family resources on which to rely, they may engage in more intensive search. Finally, for the same reason, they may begin working before graduation more often than do private school graduates.¹⁶

Scholarship recipients take longer than non-recipients do to find and accept a job, despite motivation for more intensive search. Since the wages they ultimately accept are also somewhat lower than non-recipients' (see Table 2.6), we know that the extended search is not particularly productive. Their personal characteristics may somehow handicap them in the job search, endow them with higher reservation wages, or cheat them of personal contacts necessary for landing a job.

Both class dummies are significant and have a negative impact on job search, indicating that graduates after May 2000 took longer to find jobs than did the May 2000 graduates. This is most likely due to cyclical factors. The anecdotal evidence that December graduates take longer to find a job is confirmed by the data.

¹⁵ When high school GPA was included in the basic wage regression, the corresponding coefficient was negative but insignificant. This may indicate that high reservation wages are responsible for the lower hazard rate.

¹⁶ This variable also yielded a negative but insignificant coefficient in the wage regression.

Rejecting one more job offer increases the hazard rate by approximately 8%: those who reject more offers tend to be hired earlier. This, along with the positive relation between number of job offers rejected and wages, justifies using the number of rejected offers as a proxy for job search intensity and offer probability, rather than assuming that each offer rejected increases the waiting period as part of a matching process. It may also be a result of early intensive job search combined with slow hiring practices on the part of firms: by the time some firms make offers, another firm has already hired the candidate at an acceptable wage. The lower coefficient on this variable for women than for men confirms the suspicion that women face lower job offer probabilities than do men.¹⁷

The **hours** variable does not behave as expected: those who work longer hours take longer to find the job. If part-time workers were those who could not find full-time employment, the coefficient on hours would be less than 100%. Possibly, part-time workers seek flexible hours rather than high wages, set low reservation wages, and therefore accept lower offers early in the search period, exchanging wages for hours flexibility. Alternatively, they may continue working in the same positions they held during school.

Including the successful search method dummies not only improves the overall fit of the model, but also affects the coefficients on the other variables, making most of them stronger. As Table 2.7 shows, the job fair and professor recommendations have strong positive effects for women in the job search, while men who ultimately find a job through

¹⁷ Including the dummies for reasons to reject offers reveals only “unrelated to major” with a significant

resume placement have hazard rates 44% below those who use “other” methods.¹⁸ Professor recommendations are probably associated with quick hires because such recommendations are generally made during the final semester of study and professors may recommend students for immediate openings of which they are aware. Contrary to popular belief, and despite the frequent success of this search method, recommendations by friends and family have no significant impact on the hazard rate. This may be because such recommendations are used as a last resort, after trying other methods, or because students who have such recommendations at their disposal take time off before starting to work. Of course, it may mean that recommendations are no more productive than other search methods.

2.5.2.1 Extra-curricular Activities and Study Abroad

Table 2.8 presents the results of incorporating the other two variables of interest for this study—participation in extra-curricular activities and study abroad—in the basic equation. Unfortunately, the study abroad variable is available for the May 2000 class only.¹⁹ Due to the small number of observations for study abroad, a separate regression is devoted to its inclusion; it is impracticable to break the study abroad regression into gender-specific regressions.

coefficient, less than 100%. For graduates who reject job offers for this reason, there is a matching issue.

¹⁸ Methods specified under the “other” category include classified ads, internet, internships, outside placement services, and firm ownership.

¹⁹ Later surveys replaced this question with one on the importance of English in the workplace.

Table 2.8. Hazard estimates with extra-curricular activities and study abroad

Variable	All three classes			Study abroad included, May 2000 only
	All	Men	Women	All
N	521	347	174	166
female	1.1835 (0.126)	--	--	.9978 (0.992)
experience	1.5635 (0.000)	1.6280 (0.001)	1.3279 (0.139)	2.8206 (0.001)
GPA	1.0257 (0.024)	1.0096 (0.496)	1.0514 (0.018)	1.0198 (0.357)
High School GPA	.9691 (0.000)	.9663 (0.001)	.9762 (0.141)	.9626 (0.014)
scholarship	.8619 (0.235)	.9957 (0.978)	.6461 (0.063)	1.0801 (0.751)
December 2000	.5494 (0.000)	.5133 (0.000)	.6391 (0.074)	--
May 2001	.6910 (0.002)	.6930 (0.015)	.7460 (0.159)	--
rejected offers (#)	1.0814 (0.002)	1.0694 (0.020)	1.0600 (0.356)	1.0396 (0.377)
income (thousands)	1.0436 (0.000)	1.0329 (0.009)	1.0753 (0.020)	1.0105 (0.449)
hours	.9894 (0.199)	.9813 (0.107)	.9907 (0.483)	.9830 (0.351)
public high school	1.6292 (0.001)	1.5575 (0.021)	1.7957 (0.046)	2.0860 (0.019)
extra-curricular activities	1.3433 (0.022)	1.0668 (0.695)	1.6616 (0.024)	1.0666 (0.794)
study abroad	--	--	--	.6710 (0.039)
Search methods				
placement	1.1321 (0.442)	1.0934 (0.649)	1.1521 (0.647)	.5611 (0.108)
job fair	1.2251 (0.634)	1.1698 (0.740)	5.7838 (0.106)	69.5985 --
professor	1.7563 (0.009)	1.3691 (0.343)	1.9927 (0.033)	.9224 (0.843)
friends	.9928 (0.951)	.9894 (0.944)	1.0048 (0.983)	.9957 (0.987)
resume	.6354 (0.000)	.5603 (0.000)	.7965 (0.322)	.4106 (0.001)
Pr(> χ^2)	0.0000	0.000	0.0007	0.0004
Log Likelihood	-828.84993	-505.67021	-232.59032	-201.38009

Note: p-values in parentheses.

The assertion that participation in extra-curricular activities improves employability is confirmed: participants enjoy hazard rates 34% above non-participants, on average. Upon closer inspection, however, it is clear that women are the principal

beneficiaries: while the coefficient for men is insignificant, women who participate in extra-curricular activities have marginal hazard rates 66% higher than those of other women. This may explain, in part, why the coefficient on extra-curricular activities was negative in the wage regression: these women may set lower reservation wages and so accept earlier offers. If extra-curricular activities increase the offer probability for women, then both wages and the employment hazard may be lower for these women.²⁰

Study abroad seems to have the opposite effect: college graduates who went abroad during college have hazards 33% below those of alumni who did not participate in foreign exchange programs. A possible explanation is that at least some of those who studied abroad go back to visit after graduation, before beginning the job search. Another is that some of those who do not study abroad may start work early: that is, study abroad and early work experience are substitutes. Interacting study abroad and experience eliminates this last possibility: although the estimated effect is 88.5%, it is insignificant (p -value=0.752). Interacting study abroad with GPA, scholarship, public school, and female also yielded insignificant coefficients.²¹ A third explanation is that study abroad participants over-estimate their own worth, and thus set high reservation wages, for lack of information.

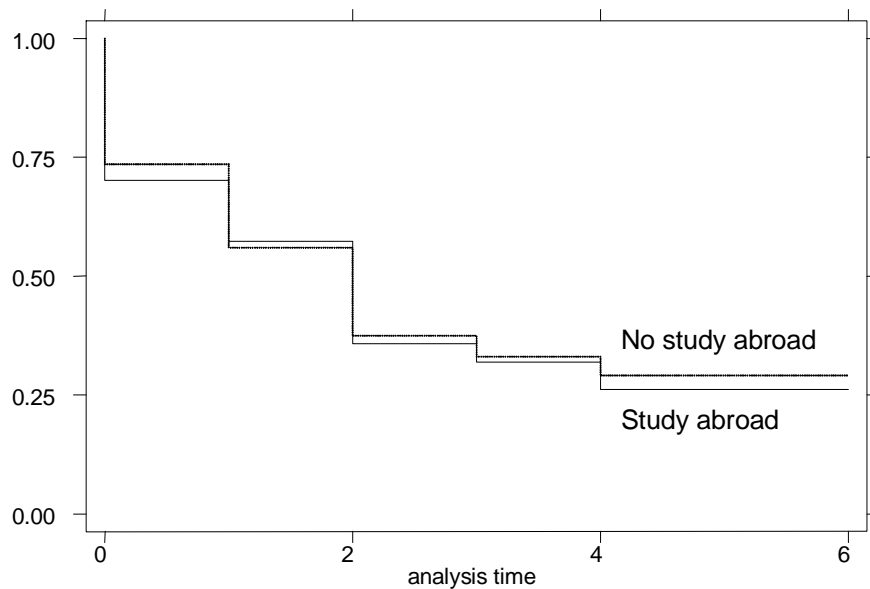
²⁰ The survey data include three types of extra-curricular activity. Using these category dummies instead of the single dummy, however, yielded insignificant coefficients for all three categories. Interacting the extra-curricular activities dummy with GPA, study abroad, public school, and scholarship yielded a significant coefficient on public school only: 0.32-0.33 (depending on other interacted variables included) at the 0.01 level. Evidently, public high school graduates benefit considerably less from participation in extra-curricular activities than do their private-school classmates in the job search.

²¹ In cursory income regressions, breaking extra-curricular activities into “cultural”, “athletic”, and “student politics”, the first had a negative effect on income, while the other two coefficients are positive but insignificant.

The proportional hazards model alone gives us no insight into the reasons behind the marginal effects on the hazard rate, but the positive (albeit insignificant) coefficient in the wage regression (Table 2.6) indicates that high reservation wages may be a factor with some employees.

Including the study abroad variable in the Cox proportional hazards model is questionable. This model depends on the assumption that a given variable included has the same effect on the hazard rate at each point in time. As Figure 2.1 shows, the survival functions of the two groups (those who did and did not study abroad) are not parallel, as they should be: they cross twice.

Figure 2.1. Kaplan-Meier survival estimates for graduates, by study abroad



Unfortunately, due to the small sample size, separate estimates (See Table 2.9) yield insignificant coefficients on all variables except nepotism in the group that studied abroad. Those who did not study abroad have coefficients similar to those in Table 2.8,

with one notable exception: in the full model (including hours, income, and search methods), experience has a much higher coefficient than those in Table 2.8. Perhaps some of those who do not study abroad are unable to leave because they are working and studying concurrently.

Table 2.9. Two specifications of the hazard, by study abroad

Variable	Studied abroad		Did not study abroad		Studied abroad		Did not study abroad	
	Coeff.	p-val.	Coeff.	p-val.	Coeff.	p-val.	Coeff.	p-val.
female	.9402	0.830	.8321	0.123	1.0608	0.872	1.3350	0.314
exp	1.2465	0.422	1.3546	0.155	1.9674	0.243	4.4964	0.002
GPA	.9676	0.335	.9997	0.992	1.0255	0.561	.9946	0.869
GPAHS	.9688	0.170	1.0048	0.765	.9537	0.178	.9748	0.249
scholar	1.3134	0.465	1.6740	0.062	.8705	0.801	1.4539	0.300
rejected offers (#)	1.0356	0.510	1.1082	0.088	1.0247	0.771	1.2760	0.003
income (thousands)	--		--		1.0365	0.538	1.0122	0.696
hours	--		--		.9888	0.735	.9859	0.599
public high school	1.3174	0.606	.9763	0.941	1.3390	0.653	2.7338	0.026
extra-curricular	.8093	0.613	.8982	0.700	1.4905	0.448	1.2218	0.543
activities								
nepotism	--		--		4.7001	0.002	1.3862	0.285
Search method								
placement	--		--	--	2.7515	0.259	.2683	0.023
job fair	--	--	--	--	--		97.2307	--
professor	--	--	--	--	1.0100	0.995	.6588	0.394
friends	--	--	--	--	.5426	0.308	.7114	0.402
resume	--	--	--	--	.5205	0.368	.3078	0.006
N		88		134		63		100
Pr(> χ^2)		0.3366		0.1955		0.0147		0.0019
Log Likelihood		-127.14047		-196.25627		-66.165315		-109.78472

2.5.2.2 Broadening the sample

Using the characteristics of the job taken—income and hours, for example—limits the sample to those graduates who were hired before the survey, that is, within six months of graduation. Those who are still unemployed at six months are excluded due to missing values. In order to include these graduates without ignoring income, imputed income was used. Income was imputed using the following variables: female, scholarship, college

GPA, high school GPA, verbal entrance exam, math entrance exam, “plan”, participation in extra-curricular activities, age, average income for the major, time to employment, public high school attendance, and class dummies. As a result, 34.88% of the observations were assigned imputed income.

The regression results are presented in Table 2.10. The increased number of observations allows the estimation including study abroad to be broken down by gender. Hours, the number of rejected offers, and search method are omitted, as imputing these would be difficult to justify.

Table 2.10. Hazard estimates with imputed income, full sample

Variable	Without study abroad			With study abroad		
	All	Men	Women	All	Men	Women
N	1,055	671	384	356	214	142
female	1.1716 (0.127)	--	--	.9828 (0.910)	--	--
experience	1.1555 (0.109)	1.5176 (0.000)	1.4320 (0.005)	1.3734 (0.014)	1.4513 (0.028)	1.3292 (0.196)
GPA	1.0153 (0.158)	1.0127 (0.234)	1.0176 (0.252)	1.0325 (0.054)	1.0103 (0.616)	1.0774 (0.011)
High school GPA	.9984 (0.836)	.9871 (0.081)	.9893 (0.335)	.9848 (0.154)	.9889 (0.405)	.9680 (0.080)
scholarship	.9455 (0.612)	.9608 (0.711)	1.0205 (0.899)	1.1758 (0.356)	1.1470 (0.521)	1.0318 (0.923)
December 2000	1.1807 (0.165)	.9641 (0.753)	1.0311 (0.864)	--	--	--
May 2001	.8619 (0.181)	.8118 (0.057)	.9495 (0.726)	--	--	--
income (thousands)	1.1120 (0.000)	1.0869 (0.000)	1.1465 (0.000)	1.1271 (0.000)	1.0931 (0.000)	1.2068 (0.000)
public high school	.9037 (0.482)	.9218 (0.575)	1.0523 (0.795)	1.1387 (0.553)	.9178 (0.785)	1.5437 (0.175)
extra-curricular activities	1.1097 (0.380)	1.0155 (0.897)	1.1483 (0.396)	.7609 (0.116)	.6841 (0.085)	.9511 (0.853)
study abroad	--	--	--	1.0372 (0.783)	1.0318 (0.853)	.9165 (0.699)
Pr(> χ^2)	0.0000	0.0000	0.000	0.000	0.0001	0.0004
Log Likelihood	-1268.508	-1198.803	-586.262	-535.778	-315.059	-194.990

Note: p-values in parentheses.

In this larger sample, which includes unemployed graduates, many of the variables lose their significance. Only (imputed) income remains incontrovertibly

important, while the coefficient on experience is significant in most of the regressions. GPA is significant in the regression that includes study abroad, but mainly for females. Participation in extra-curricular activities is significant at the 0.10 level for men only, and only in the regression including study abroad, but with the opposite effect of that observed above.

We are unable to draw conclusions from this larger sample due to censoring: of the 1,055 observations, only 775 are hired, while the remaining 280 (26.5% of the sample) are censored. The results in the smaller sample might be over-estimates of effects, if there are important differences between those hired and those who are censored at six months. There may also be some unobserved heterogeneity for which we have not accounted. Table 2.11 summarizes the means (and standard deviations) for graduates unemployed at six months and those hired before the survey. The main difference between the two types is imputed income. Removing imputed income from the regression restores a little significance. These results are presented in Table 2.12.

Table 2.11. Hired vs. not hired six months after graduation (means)

Variable	Unemployed	Hired
Experienced	.4193548 (.4941786)	.5614618 (.4964831)
GPA	83.39461 (5.31671)	83.45546 (5.68266)
High School GPA	84.85304 (7.57087)	84.49377 (7.944087)
Scholarship	.2394822 (.4274597)	.2830189 (.4507314)
Imputed Income	6.888574 (2.432548)	10.12405 (5.237269)
Public High School	.1636364 (.3705071)	.1177803 (.3225305)
Extra-curricular activities	.8230088 (.3822254)	.8165548 (.3872477)
Study abroad	.3831776 (.4884488)	.4187726 (.4942509)

Note: standard deviations in parentheses.

Table 2.12. Hazard estimates without income, full sample

Variable	Without study abroad		With study abroad	
	All	All	Men	Women
N	1,055	356	214	142
female	.8376 (0.064)	.6502 (0.002)	--	--
experience	1.1912 (0.052)	1.4274 (0.005)	1.5836 (0.004)	1.1478 (0.499)
GPA	1.0136 (0.218)	1.0205 (0.216)	.9981 (0.924)	1.0682 (0.023)
High school GPA	.9976 (0.755)	.9903 (0.350)	.9904 (0.457)	.9851 (0.412)
scholarship	1.0046 (0.966)	1.1211 (0.514)	1.0570 (0.794)	1.0557 (0.870)
December 2000	1.2887 (0.033)	--	--	--
May 2001	.8190 (0.071)	--	--	--
public high school	.8214 (0.168)	.9802 (0.927)	.7697 (0.404)	1.2854 (0.421)
extra-curricular activities	1.0367 (0.759)	.8297 (0.263)	.7196 (0.129)	1.0324 (0.905)
study abroad	--	1.0286 (0.831)	.9878 (0.941)	.9618 (0.860)
Pr(> χ^2)	0.0002	0.0156	0.1095	0.3988
Log Likelihood	-1308.3754	-558.51799	-324.89201	-205.67443

Note: p-values are in parentheses.

2.5.2.3 Limiting the sample to those hired after graduation

The analysis so far has used as many observations as possible by including those who already had employment at the time of graduation (323 of the observations). Since we defined $t = 0$ at graduation,²² by definition those who started working before graduation had work experience. This fact biases the estimate on experience upward. In this section, I limit the observations to those who obtained employment after graduation. We can expect the significance of coefficients to be reduced due to the smaller sample size. Table 2.13 presents the results for the same regressions run in Table 2.8, but with this reduced sample.

²² This definition was chosen because we do not know how many pre-graduation months of experience were in the post-graduate job. That is, we do not know how long before graduation the student may have begun working for the post-graduation employer.

Table 2.13. Hazard estimates for those hired after graduation

Variable	Without study abroad			With study abroad
	All	Men	Women	All
N	350	224	126	105
female	1.2859 (0.064)	--	--	1.0611 (0.839)
experience	1.0859 (0.562)	1.0731 (0.715)	1.0284 (0.906)	2.2605 (0.126)
GPA	1.0415 (0.005)	1.0212 (0.263)	1.0658 (0.020)	1.0446 (0.141)
High school GPA	.9743 (0.019)	.9665 (0.013)	.9892 (0.603)	.9421 (0.006)
scholarship	.8308 (0.230)	.9665 (0.854)	.6552 (0.135)	1.2684 (0.463)
December 2000	.4425 (0.000)	.4592 (0.000)	.4025 (0.004)	--
May 2001	.6193 (0.001)	.6354 (0.022)	.6444 (0.102)	--
rejected offers (#)	1.1261 (0.000)	1.1238 (0.002)	1.0629 (0.450)	1.1406 (0.036)
income (thousands)	1.0179 (0.268)	1.0006 (0.559)	1.0458 (0.284)	1.0082 (0.845)
hours	.9831 (0.102)	.9790 (0.086)	.9848 (0.366)	.9578 (0.112)
public high school	1.5756 (0.021)	1.5524 (0.086)	1.6151 (0.203)	2.4522 (0.036)
extra-curricular activities	1.4085 (0.035)	1.0431 (0.845)	1.7930 (0.031)	1.1236 (0.734)
study abroad	--	--	--	.5003 (0.010)
Search methods				
placement	1.2409 (0.339)	1.1975 (0.533)	1.0601 (0.871)	.4618 (0.197)
job fair	.7074 (0.634)	.3843 (0.349)	623.2558 (1.000)	--
professor	2.9254 (0.000)	2.9392 (0.010)	2.1121 (0.119)	1.6114 (0.412)
friends	1.1739 (0.296)	1.1304 (0.543)	1.2883 (0.384)	.6662 (0.335)
resume	1.0304 (0.853)	.9168 (0.668)	1.0985 (0.748)	.6644 (0.368)
Pr(> χ^2)	0.0000	0.0002	0.0097	0.0037
Log Likelihood	-451.91303	-274.98721	-136.90839	-101.83427

Note: P-values are in parentheses.

As expected, the experience variable loses its significance when the sample excludes those who were already employed at graduation. On the other hand, the effect of **female** is now significant at the 0.10 level and positive, whereas it was insignificant in the full sample. Evidently, women who obtain employment sometime after graduation are hired sooner on average than are similar male competitors.

The results for extra-curricular activities and study abroad are mixed. Women who participated in extra-curricular activities in college enjoy post-graduation hazard rates 79% above their non-participatory female classmates, but men who participate have roughly the same hazard regardless of participation in extra-curricular activities. When study abroad is included, the coefficient on extra-curricular activities becomes insignificant, while study abroad reduces the hazard by 50% for students who were not hired before graduation. Either study abroad does not make these students attractive employees, or they are doing something else instead of looking for jobs, or they overestimate their worth and refuse reasonable offers.²³

If we remember that, on average, those who had studied abroad are hired sooner, and combine that observation with the negative effects of study abroad on the employment hazard rates, we must conclude that characteristics other than study abroad per se are responsible for the faster hires of students who have studied abroad.

2.5.2.4 Other factors of interest

Including college dummies (to differentiate business and engineering students from liberal arts students) changes the significant coefficients by less than one percentage point, while the coefficient on each college is insignificant. Including major dummies gives null results.

Some graduates go abroad after graduation to study a language, or take other courses deemed valuable for employment. Concerned that these out-of-the-labor-force

²³ Regressions were also run using imputed income and without income among the covariates. Imputed income yielded results similar to those in Table 9. Omitting income resulted in a poor fit due to heterogeneity: those still unemployed at six months have less experience, are less likely to have studied abroad, and more likely to have attended public schools and participated in extracurricular activities.

students might influence the hazard, I omitted them from the sample, but again, the significant coefficients changed little and the fit was not improved.

In most employment studies, the self-employed are excluded. I have included them in the preceding analysis. Logically, however, both the self-employed and those who work for family firms might enjoy higher hazards, since they are generally at leisure to decide when to start working. (If they start later, they either take these jobs as a last resort, or take a vacation before working.) Figure 2.2 demonstrates that including “nepotism”—defined as self- or family-employed—in the Cox proportional hazards model is appropriate: the two survival functions are approximately parallel.

Figure 2.2. Survival functions according to relation to employer

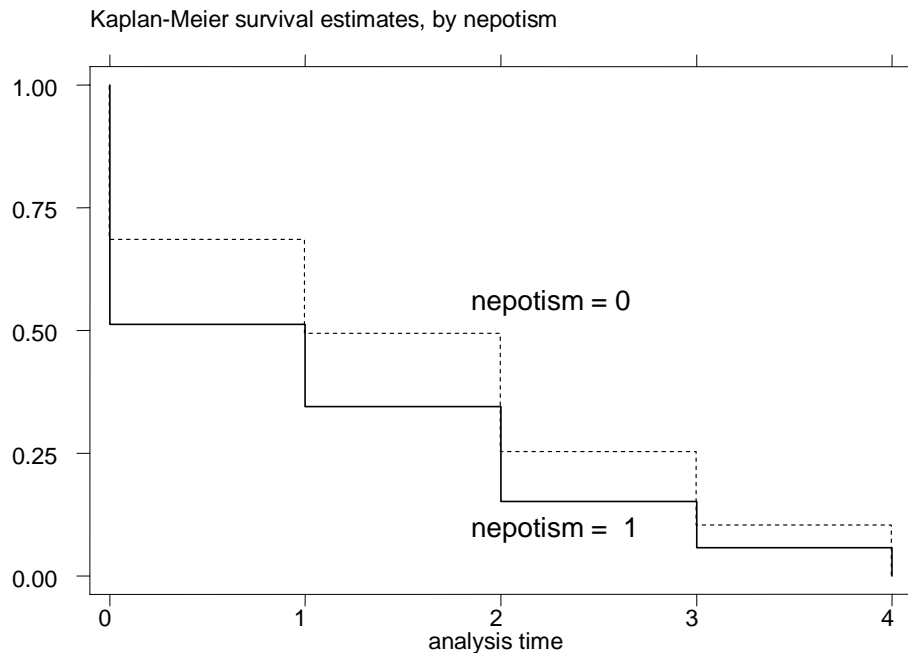


Table 2.14 summarizes the results of including nepotism. The coefficient on nepotism is significant in each regression except that pertaining to men alone. In addition, several of the other coefficients have changed relative to those in Table 2.8, but by fewer than five percentage points in most cases. The most affected—logically—are the coefficients on the search method dummies. When dummies for self-employed and family-employed are included in the wage regression, the coefficients are positive but utterly insignificant.

Interestingly, participation in extra-curricular activities has a stronger positive effect on the hazard for those who ultimately are self- or family-employed (165%) than for those who are unrelated to their employers (133%). Since these estimates are for the full sample (including those who had work at graduation), it is possible that the self- and family-employed have flexible work schedules that enable them to participate in extra-curricular activities. Another possible explanation is that the same values that contribute to entrepreneurship also lead one to join student groups. If these values are acquired in the family, it should not matter whether the entrepreneur is the graduate or another member of the graduate's family.

When study abroad is included, the coefficient on nepotism increases relative to the first three columns.²⁴ At the same time, the coefficient on study abroad is roughly the same as in Table 2.7 (67%). Among those who study abroad, those who work in the family firm (or their own) tend to start work earlier than those who do not.

Table 2.14. Hazard estimates accounting for the self-employed and those who work in family firms, full sample

Variable	Full sample	Regressions by gender		Regressions by relationship to firm		Study Abroad Full sample
		Men	Women	Owner or family firm	Other	
N	488	336	162	121	367	163
female	1.2356 (0.066)	--	--	1.4204 (0.175)	1.2118 (0.153)	1.1386 (0.552)
experience	1.5587 (0.000)	1.6261 (0.002)	1.3371 (0.154)	1.8008 (0.029)	1.4005 (0.012)	2.3927 (0.010)
GPA	1.0232 (0.050)	1.0077 (0.597)	1.0466 (0.046)	1.0136 (0.606)	1.0237 (0.082)	1.0264 (0.239)
High school GPA	.9701 (0.001)	.9656 (0.001)	.9836 (0.358)	.9586 (0.046)	.9732 (0.006)	.9560 (0.006)
scholarship	.9398 (0.639)	1.0876 (0.603)	.6908 (0.131)	1.3293 (0.420)	.8993 (0.466)	1.2101 (0.444)
December 2000	.5308 (0.000)	.5051 (0.000)	.6202 (0.064)	.3883 (0.002)	.6341 (0.003)	--
May 2001	.6754 (0.001)	.7023 (0.023)	.6969 (0.095)	.4035 (0.000)	.8336 (0.205)	--
rejected offers (#)	1.0898 (0.001)	1.0775 (0.010)	1.0697 (0.299)	1.0866 (0.171)	1.1010 (0.002)	1.0637 (0.184)
income (thousands)	1.0437 (0.000)	1.0324 (0.017)	1.0504 (0.130)	1.0194 (0.476)	1.0456 (0.002)	1.0290 (0.276)
hours	.9912 (0.304)	.9870 (0.286)	.9939 (0.663)	.9836 (0.273)	.9938 (0.579)	.9812 (0.315)
public high school	1.7175 (0.001)	1.6708 (0.009)	1.7686 (0.062)	1.8649 (0.147)	1.5964 (0.007)	2.2157 (0.014)
extra-curricular activities	1.3776 (0.016)	1.1277 (0.478)	1.6905 (0.025)	1.6511 (0.075)	1.3308 (0.071)	1.1182 (0.654)
study abroad	--	--	--	--	--	.6669 (0.039)
Nepotism	1.3599 (0.011)	1.1924 (0.228)	1.7409 (0.027)	--	--	2.0666 (0.001)
Search method placement	1.1149 (0.526)	1.0187 (0.930)	1.2229 (0.541)	.4052 (0.268)	1.2468 (0.231)	.7052 (0.352)
job fair	1.3577 (0.477)	1.2278 (0.667)	5.4712 (0.119)	--	1.2322 (0.632)	--
professor	1.7654 (0.011)	1.4887 (0.233)	1.9016 (0.057)	.6880 (0.669)	2.0079 (0.004)	1.0166 (0.968)
friends	.9959 (0.973)	.9941 (0.970)	1.0036 (0.988)	.7844 (0.325)	.9887 (0.940)	.9090 (0.736)
resume	.6766 (0.004)	.5796 (0.002)	.8519 (0.502)	.5524 (0.188)	.7053 (0.022)	.4906 (0.015)
Pr(> χ^2)	0.0000	0.000	0.0020	0.0125	0.0000	0.0000
Log Likelihood	-859.43395	-468.02881	-215.64705	-148.51162	-541.05633	-192.6728

Note: p-values in parentheses.

²⁴ In Table 3, the coefficient on nepotism was much higher for those who studied abroad than for those who did not: 470% vs. insignificant.

2.6 Conclusions

The main purpose of this study was to determine the effects on job search of three variables: study abroad, GPA, and participation in extra-curricular activities. As an increase in each of these variables was expected to make a given graduate more attractive to employers, we anticipated a coefficient greater than one on each of these variables in the employment hazard function. The results, however, are more complex. The effect of GPA on the employment hazard is mixed: overall, women with a higher college GPA are hired sooner, but men with good grades enjoy no such distinction. This may be because women set lower reservation wages than men; the lower wages accepted by women lends credence to this possibility.

Women who participated in extra-curricular activities during college were hired more rapidly at graduation than were those who did not, fulfilling our expectation, while men who participated in extra-curricular activities had roughly the same hazard as their non-participant classmates. Since the accepted wage is also reduced by participation in extra-curricular activities, the lower hazard may be, at least in part, a result of lower reservation wages. These, in turn, could be the product of better labor market information emerging from student group networks. Interestingly, the self-employed or family-employed enjoy higher marginal effects on the hazard from participation in extra-curricular activities than do those who work for an unrelated employer.

On the other hand, students who studied abroad at some time during college are one-third less likely to be hired at any given time than are those who stayed in Mexico. While study abroad is associated with a search period 50% longer on the margin, once employed these graduates enjoy marginal earnings almost 20% higher than similar

alumni who did not study abroad. A notable exception is Engineering majors: despite participating in internships and other Engineering-specific study abroad programs, Engineers who studied abroad earn approximately 5% less on the margin than otherwise identical Engineers who did not. On average, however, study abroad graduates are hired sooner, suggesting that there are significant differences between students who do and do not study abroad, and that the longer marginal search on the part of study abroad alumni is due to higher reservation wages or matching issues.

As expected, women are more responsive to increases in wages than are men. While an increase in monthly compensation of 1000 pesos improves men's marginal employment hazard by 2-4%, for women this same increase contributes to a marginal rise in the employment hazard of between 5% and 8%, double the male response.

It is important to differentiate between graduates who start work before and after graduation. For example, in the entire sample, there is no significant difference between men and women, but among those who did not have a job at graduation, women were quicker to be hired after graduation than were similar men. Studies that limit their samples to those who were unemployed at graduation are omitting an important part of the population and ignoring the relevance of working during school.

This study could be extended in several ways. First, it could be updated using more recent data from the same source. Increasing the sample size in this way would allow for interesting sub-sample estimation.

Second, a larger independent survey could be carried out. While the results contained here are interesting in their own right, it would be better to use data covering a larger portion of Mexican college graduates. A national survey of recent college

graduates could be carried out by encouraging cooperation between several of Mexico's colleges and universities, which already conduct their own surveys, and making the data available to researchers.

Third, the results from this study need to be compared with the search outcomes in other countries. Unfortunately, there has been a paucity of such studies: the search literature has been limited to the effects of unemployment insurance and training programs on unemployment duration, and the job search success of high school graduates. University graduates, on the other hand, have received almost no attention. The current study is appropriate for university graduates in the United States, for example, where student loan payments must begin six months after graduation. The importance of extra-curricular activities and study abroad, however, may be quite different for those graduates than for Mexican alumni.

Chapter 3

The Returns to a Foreign Education:

The Effects of Study Abroad on Earnings for Mexican College Graduates

3.1 Introduction

There are three big questions in the migration literature. The first question—Who migrates and why?—is interesting as an intellectual exercise and because it is key to answering the other two. The second question—What are the effects of immigration on the receiving country?—has been the most studied, perhaps because it has important policy implications. The third question, which has attracted relatively little attention, is: What are the effects of emigration on the sending country? For some time, this subject was limited to the development field in the context of human capital flight, the so-called “brain drain,” which has been a cost associated with emigration from less-developed countries. These same countries benefit from remittances, which have drawn attention in the 1990s and early twenty-first century. There is also a growing literature on temporary migration by laborers as a source of capital or skills. This essay is concerned with the effects of another type of temporary emigration: the economics of study abroad.

Grubel and Scott (1966) is the only explicit examination I have found on the economics of study abroad. The authors estimate the aggregate costs and benefits to the United States of both receiving foreign students and sending American students abroad at the undergraduate and graduate levels. The economic value of study abroad is approximated with the resource cost of education. The overall conclusion of that study is that the United States derived (at that time) a net benefit from participation in foreign

exchange programs, both through the education acquired by Americans abroad and by that invested in foreign students who remained in the US after graduation. The methodology may have suited the purpose of that report, but allows for little insight into the relative marginal value of foreign (vs. domestic) human capital to individuals.

Chiswick (1978) and Friedberg (2000) use marginal analysis to address the geographic composition of human capital and the earnings of immigrants to the United States and Israel, respectively. Both of these studies decompose human capital into pre- and post-immigration years of schooling. Neither controls directly for language skills, but the former includes separate regressions for immigrants from English-speaking countries and from other countries.²⁵

The present study differs from Chiswick and Friedberg in three ways. First, my sample consists of primarily native-educated natives who have chosen to leave the country during part of their education and subsequently return. Thus, I expect these individuals to understand the native market better than would immigrants. Second, I control for acquired language skills, an important omission in the Friedberg study especially. Clearly, the issue of language is much more important for a recent immigrant, who must learn the language of his new country,²⁶ than for a native acquiring a second language. Nevertheless, to the extent that foreign language mastery is a marketable skill, it is important to take this into account when estimating the returns to foreign education. Third, my analysis is limited, by virtue of the sample, to individuals with at least a

²⁵ Betts and Lofstrom (2000) estimates the returns to pre- and post-immigration education, but controls for neither language skills nor country of origin.

²⁶ Chiswick and Miller (1995) examine the language skills of immigrants and their effect on earnings in Australia; they do not, however, decompose education into foreign and domestic schooling.

college education. As all of the individuals are alumni of the same university, the sample is relatively homogeneous. The returns to study abroad may be smaller for this sample than for the population as a whole. That is, having studied abroad may be more valuable for workers who have not reached college.

There are many reasons to study abroad, among them: it represents a cultural experience similar to vacation; it may open opportunities for permanent emigration; or it may yield a higher income path in the home country after graduation.²⁷ The first reason is of little concern here, as it is not an economic motivation. The second belongs in the context of permanent migration analysis; furthermore, in the case of Mexicans, it is an uncommon motivation for study abroad (Glaser, 1978). The last of the reasons listed, higher earnings in the home country as a result of studying abroad, is the focus of my study.

The decision to study abroad should, then, be considered in a life-cycle context. This is a standard investment-in-education decision, with the difference that instead of a yes-no decision, it is a qualitative one. The returns to education in general, and in Mexico specifically, have been studied extensively (e.g., Ashenfelter and Krueger, 1994; Cragg and Epelbaum, 1996; Muñoz Izquierdo *et al.*, 1978). School quality may influence earnings (Card and Krueger, 1992a, 1992b) and foreign schools may be perceived as higher-quality institutions. Mexicans on the verge of an educational investment decision are expected to take this into consideration.

²⁷ Glaser (1978) shows that for Mexicans, the prestige of a given school was more important than lack of programs at home. In fact, while “educational benefits” were the principal reason for study abroad in the multinational sample, Mexicans had below-average responses for “training abroad superior”, facilities abroad superior”, and “no courses at home”.

An individual who expects to reside permanently in the home country will study abroad if and only if he expects higher income from that choice, due to a combination of his own personal characteristics and/or his chosen profession. According to Borjas and Bratsberg (1996: 165), “The return migration may have been planned as part of an optimal life-cycle residential location sequence, wherein some immigrants migrate...for a few years, accumulate financial resources or other types of capital [like human capital], and then return to the source country.” There are many factors of study abroad that may increase salaries: improved language skills, networking, increased cultural understanding (we might refer to this as “global interpersonal skills”), or higher quality of education. Study abroad may, on the other hand, simply be a signal to employers seeking a certain kind of employee. The task of this study is to determine, first, whether those who study abroad for some period of time earn more than do their compatriots who study at home, and, second, if so, why.

The paper proceeds as follows. Section 3.2 describes the data, a unique database to which I have exclusive access. Section 3.3 explains the theoretical model and its econometric application. Section 3.4 summarizes the main results. I find that certain types of study abroad contribute to higher earnings, beyond the value of language skills, but that this effect diminishes over time. The earnings differentials associated with foreign human capital and language skills differ between Mexico’s largest cities and the rest of the country. Of particular interest, more able students derive greater economic benefit from foreign graduate programs than do less able students. Section 3.5 provides conclusions and policy implications.

3.2 Data

The data are from a 1998 survey applied by a Mexican university to its alumni from the classes of 1976, 1986, and 1996. Although an attempt was made to contact as many alumni as possible from these classes, not all graduates were located. Thus, there is probable self-selection by less mobile alumni, or at least by those whose parents were less mobile. In addition, response was voluntary, so self-selection by satisfied graduates is likely. Some alumni agreed by telephone to complete the questionnaire, but did not return it, despite duplicate mailings to non-responsive addresses. During the database compilation, some observations were dropped for reasons unknown to me. The resulting sample consists of 13% of the three classes, with the most recent class better represented than previous classes.²⁸ Consistent with educational trends, women are an increasing proportion of the sample; this is exaggerated, however, because women are under-sampled relative to men in the first two classes and over-sampled in the last. Some majors are unrepresented in the earlier classes. Given these sampling anomalies, we must exercise caution in extrapolating our conclusions to the population at large.

The data include a series of indicator variables for study abroad at various levels: basic education (pre-high school), high school, college, graduate school, language courses, and other (relatively brief) courses. The number of years spent abroad is not provided, but the country visited is: the United States is the country of study most

²⁸ According to supporting documentation provided with the data, seven, ten, and seventeen per cent, respectively, of the 1976, 1986, and 1996 graduates (all graduates, not only those located) returned the questionnaire. The exact response rate is unavailable: the total number of surveys sent (including second mailings to the same address), total number of alumni, and number of responses are the only data that have been preserved.

frequently chosen at any level.²⁹ Almost all those who spent time abroad during graduate school completed their graduate studies abroad; in a few cases, a double-degree was pursued, with one year in Mexico and one abroad. At the college level, because these observations are alumni of a Mexican university, the time abroad is generally one semester or one year: none has a foreign university degree. In primary and secondary schools, it is impossible to estimate the time spent abroad, since this was probably linked to family residence abroad. In high school we might guess that some spent exactly one year abroad as part of a foreign exchange program, while others lived with their families abroad for an indefinite period.

3.2.1 Variables included in the estimation

SAbasic is a dummy, 1=studied abroad in elementary or secondary school.

SAhighschool is a dummy, 1=studied abroad in high school.

SACollege is a dummy, 1=studied abroad as part of college.

SAgrad is a dummy, 1=studied abroad during graduate studies. Includes double-degrees (one year abroad during a master's program), master's degrees, and Ph.D.s.

SAother is a dummy, 1=studied abroad in some other context. Most of these are firm-specific training courses or language courses.

Abroad is a dummy equal to one if any of the above variables is equal to one, zero otherwise.

WorkAbr is a dummy, 1=have worked abroad at some time.

²⁹ Of study abroad respondents indicating the destination country, 85% at the pre-high school level studied in the United States; 91% of high school study abroad participants; 59% in college; 65% for graduate school; 57% for languages; and 57% for "courses". Some respondents studied in multiple countries, especially in the language category.

English and **French** are categorical variables concerning proficiency in these languages, ranging from 0 (none) to 4 (very good). This variable is included to sort out the language aspect from other benefits of study abroad.

Real current earnings are reported (in ranges), for the current or most recent job. The midpoint was taken, with the top-coded category multiplied by 1.5, and the real (1998=100) value was calculated using the CPI. (Banco de México).

Female is a gender dummy, 1=female. Women are expected to earn less.

Age and its square are included, calculated as (1998- year of birth).

Class1976 and **Class1986** are dummies representing the official year of graduation, to capture any cyclical effects immediately following graduation and trends over time. For example, 1986 and 1996 were years of emergence from economic crises.

Experience is calculated using information about time out of the labor force³⁰ or unemployed. The square of this variable was also included.

MA is a dummy, 1=master's degree completed.

PhD is a dummy, 1=Ph.D. completed.

GPA70 is a dummy indicating an accumulated college grade point average between 70 and 79.9 (self-reported), inclusive.³¹

GPA80 is a dummy indicating an accumulated college grade point average between 80 and 89.9 (self-reported), inclusive.

³⁰ This includes time to first job and periods of six months or more during which the individual was not working for any reason, including graduate school.

³¹ College GPA was self-reported in six five-point ranges. I translated these into three dummies corresponding to seventies, eighties, and nineties. Since approximately two-thirds of the sample falls in the middle category, the two extreme category dummies are used in the regressions. GPA is a proxy for both ability and motivation and is expected to be positively related with income.

GPA90 is a dummy indicating an accumulated college grade point average between 90 and 100 (self-reported), inclusive.

Public elementary equals 1 if the individual attended a public (vs. private) elementary school, 0 otherwise.

Public secondary equals 1 if the individual attended a public (vs. private) middle school, 0 otherwise.

Public high school equals 1 if the individual attended a public (vs. private) high school, 0 otherwise.

Hours are the number of hours worked per week. This number was reported for some³² part-time and freelance workers. Part-time and freelance workers who did not report hours were assigned the median value (25 and 30, respectively). Full-time workers were assigned 48 hours, the Mexican standard workweek.

Single is a dummy indicating never married.

Resparents equals 1 if the students' parents lived in the same city as the university while the student attended. Students who lived with their parents have lower undergraduate costs than do those from out of town, and so may have lower credit constraints for graduate school and more funds available for undergraduate study abroad. On the other hand, college students who do not live with their parents are psychologically better prepared to study or work abroad.

³² 67 of 130 part-timers and 113 of 165 freelancers.

City equals 1 if the alumnus lived in one of Mexico’s three largest cities—Mexico City, Guadalajara, or Monterrey—at the time of the survey. The market dynamic was expected to differ between these cities and other parts of the country.³³

CityPOB equals 1 if the place of birth is one of the three largest cities.

Moved before college equals 1 if the parents’ residence during college and the student’s place of birth differ.

Moved after college equals 1 if the graduate’s current city of residence and parents’ residence during college differ.

Dummies for the parents’ education levels are also included as a proxy for family wealth: parents with higher education tend to be from wealthier families.

3.2.2 Descriptive statistics

Even these highly-educated Mexicans are geographically fairly stable; over half of respondents (376 of 708) lived in the state of their birth at the time of the survey. This pattern holds even for older graduates. Not surprisingly, those who studied college in their hometown were more likely to stay there, while alumni who were not native to the campus city are much more mobile. These data are presented in Table 3.1.

Table 3.1. Mobility of alumni (distribution)

	Born in city	Born elsewhere
still lives in birth place	65.23	43.06
moved before college	14.08	12.43
moved after college	8.62	34.68
moved before and after college	12.07	9.83
	100.00	100.00
N	348	346

³³ Unfortunately, sub-samples of other areas (such as border or coastal locations) were too small to enable

Summary statistics for the sample are in Table 3.2. Almost half of the sample studied abroad at some time. Women are less likely than men to have an income. Those reporting an income also have slightly higher grades on average than those without income at the time of the survey. The traditionally wide disparity of opportunity between the genders is evident in the educational attainment of each: approximately 65% of fathers have at least a college degree, while less than 20% of mothers do.³⁴

Table 3.3, which provides summary statistics by study abroad, demonstrates that mean earnings are higher for those who studied abroad than for those who did not, although the difference is not statistically significant.³⁵ There are other important differences between the two sub-samples. For example, all observations with a Ph.D. studied abroad at some time. Those who have studied abroad are somewhat older and more experienced; are more fluent in foreign languages; have higher college grades; are more likely to be liberal arts majors; and are less likely to have lived with their parents during college. Because there are so many differences between those who study abroad and those who do not, marginal analysis is necessary to sort out the explicit effects of study abroad on earnings.

analysis of them individually.

³⁴ It is curious, however, that for the sub-sample of observations reporting earnings, the percentage of fathers with higher education is lower while the percentage of mothers with higher education is higher.

³⁵ These simple means mask important underlying differences: those who have not studied abroad are more likely to report earnings in one of the four lowest categories than those who have studied abroad, while the opposite is true for five of the six higher income categories. Similar conclusions may be drawn by comparing study abroad and no study abroad samples within a given graduating class.

Table 3.2. Descriptive statistics

Variable	Whole sample			Earnings observations only		
	mean	s.d.	obs.	mean	s.d.	obs.
Study abroad	.4937	.5003	709	.4955	.5005	444
SAbasic	.0592	.2362	709	.0586	.2351	444
SAhighschool	.1001	.3004	709	.1126	.3165	444
SACollege	.0592	.2362	709	.0518	.2219	444
SAgrad	.0564	.2309	709	.0743	.2626	444
SAother	.3526	.4781	709	.3468	.4765	444
Work abroad	.0776	.2677	709	.0946	.2930	444
English	2.8270	.5753	709	2.8131	.5988	444
French	.1923	.5496	709	.1824	.5314	444
real earnings	27.4458	33.3561	444	27.4458	33.3651	444
female	.3216	.4674	709	.2883	.4535	444
age	29.7733	7.4532	688	31.0254	7.8953	433
experience (years)	7.5080	7.1281	709	8.8729	7.5948	444
hours	46.3214	5.9871	644	46.8889	4.9376	414
single	.5975	.4908	708	.5450	.4985	444
scholarship	.3489	.4770	685	.3545	.4789	426
Public elementary school	.7320	.4432	709	.7207	.4492	444
Public secondary school	.7024	.4575	709	.6847	.4652	444
Public high school	.6911	.4624	709	.6779	.4678	444
Business major	.2655	.4419	708	.2613	.4398	444
Engineering major	.4689	.4994	708	.4820	.5002	444
Master's degree	.1763	.3813	709	.2275	.4197	444
Ph.D.	.0113	.1057	709	.0180	.1332	444
GPA	3.5531	1.1156	687	3.5579	1.1011	432
GPA70	.1601	.3670	687	.1551	.3624	432
GPA80	.6448	.4789	687	.6481	.4781	432
GPA90	.1951	.3965	687	.1968	.3980	432
city	.6557	.4755	700	.6750	.4689	440
CityPOB	.5	.5004	708	.5056	.5005	443
resparents	.4255	.4948	698	.4566	.4987	438
move1	.2432	.4293	703	.2472	.4319	441
move2	.3256	.4690	694	.3204	.4672	437
father elementary	.0722	.2589	693	.0736	.2614	435
father secondary	.0592	.2361	693	.0598	.2373	435
father trade school	.0938	.2918	693	.0966	.2957	435
father technical school	.0505	.2191	693	.0598	.2373	435
father high school	.0707	.2565	693	.0690	.2567	435
father college	.4733	.4996	693	.4575	.4988	435
father master's	.1544	.3616	693	.1540	.3614	435
father doctorate	.0260	.1592	693	.0299	.1705	435
mother elementary	.0596	.2369	688	.0579	.2338	432
mother secondary	.0770	.2668	688	.0787	.2696	432
mother trade school	.3939	.4890	688	.4120	.4928	432
mother technical school	.0654	.2474	688	.0671	.2505	432
mother high school	.0654	.2474	688	.1366	.3438	432
mother college	.1555	.3627	688	.2153	.4115	432
mother master's	.0262	.1597	688	.0255	.1577	432
mother doctorate	.0087	.0930	688	.0069	.0831	432

Table 3.3. Descriptive statistics, by study abroad

Variable	Studied abroad			Did not study abroad		
	mean	s.d.	obs.	mean	s.d.	obs.
SAbasic	.1182	.3236	220			
SAhighschool	.2273	.4200	220			
Sacollege	.1045	.3067	220			
SAgrad	.1500	.3579	220			
SAother	.7000	.4593	220			
Work abroad	.1227	.3289	220	.0670	.2505	224
English	2.9485	.4631	220	2.6801	.6824	224
French	.2667	.6174	220	.0997	.4158	224
real earnings (thousands)	29.6910	34.2943	220	25.2408	32.3515	224
female	.2955	.4573	220	.2813	.4506	224
age	31.8733	7.9798	213	30.2046	7.7424	220
experience (years)	9.7989	7.9704	220	7.9635	7.1078	224
hours	46.5271	5.6449	203	47.2370	4.1290	211
single	.5273	.5004	220	.5625	.4972	224
scholarship	.2877	.4538	212	.4206	.4948	214
Public elementary	.8091	.3939	220	.6339	.4828	224
Public secondary school	.7409	.4391	220	.6295	.4840	224
Public high school	.6818	.4668	220	.6741	.4698	224
Business major	.2545	.4366	220	.2679	.4438	224
Engineering major	.4364	.4971	220	.5268	.5004	224
Master's degree	.2773	.4487	220	.1786	.3839	224
Ph.D.	.0364	.1876	220	0	0	224
GPA	3.6204	1.1099	216	3.4954	1.0912	216
GPA70	.1528	.3606	216	.1574	.3650	216
GPA80	.6157	.4875	216	.6806	.4673	216
GPA90	.2315	.4228	216	.1620	.3693	216
city	.6330	.4831	218	.7162	.4519	222
CityPOB	.4612	.4996	219	.5491	.4987	224
resparents	.4101	.4930	217	.5023	.5011	221
move1	.2431	.4300	218	.2511	.4346	223
move2	.3163	.4661	215	.3243	.4692	222
father elementary	.0744	.2631	215	.0727	.2603	220
father secondary	.0512	.2208	215	.0682	.2526	220
father trade school	.0884	.2845	215	.1045	.3067	220
father technical school	.0791	.2705	215	.0409	.1985	220
father high school	.0651	.2473	215	.0727	.2603	220
father college	.4512	.4988	215	.4636	.4998	220
father master's	.1535	.3613	215	.1545	.3623	220
father doctorate	.0372	.1897	215	.0227	.1494	220
mother elementary	.0516	.2218	213	.0639	.2452	219
mother secondary	.0704	.2565	213	.0868	.2821	219
mother trade school	.4319	.4965	213	.3927	.4895	219
mother technical school	.0610	.2400	213	.0731	.2608	219
mother high school	.1315	.3387	213	.1416	.3494	219
mother college	.2254	.4188	213	.2055	.4050	219
mother master's	.0188	.1361	213	.0320	.1763	219
mother doctorate	.0094	.0967	213	.0046	.0676	219

Note: All observations in this table reported positive earnings.

3.3 The Model

3.3.1 Theoretical model

I argue that the study abroad decision is made in the context of lifetime utility maximization. This dynamic is very much like the choice between private and public schools, or between attending college or not. In reality, there is a large menu from which the prospective student may choose, but for expository clarity I will assume that the choice is between the best attainable domestic program and the best attainable foreign program. The relative net present values of going abroad and staying home should influence this decision.

At each schooling level, the individual assesses her options given her background and decides, first, whether to pursue the next level and, then, where to study (Cameron and Heckman, 2001). Thus, we can abstract from the schooling level decision and focus on the locational choice.

Formally, the individual maximizes lifetime utility derived from consumption and location:

$$\sum_{t=1}^T \delta^t U(c_t, l_t) \tag{3.1}$$

where

T = expected time of retirement

δ = discount rate for time preference

c_t = consumption level at time t ³⁶

l_t = location at time t

Going abroad may be associated with utility or disutility. Since the observations in my sample reside in Mexico, either they prefer to live in Mexico or were unable to obtain suitable employment abroad. There is some utility derived from being in a new place, but once the novelty wears off, homesickness and disutility set in. Thus, for undergraduates who spend a semester or two abroad, more utility than disutility is derived directly from being in a foreign country, while for longer periods required for higher degrees, this is not necessarily so, and permanent residence abroad is undesirable.

The student is subject to a three-part budget constraint, which results in a discontinuous age-income profile. Each year, any remaining income goes into saving ($d_t \geq 0$). In the first period, during schooling, consumption (c) and school-related costs (k) cannot exceed income (y) plus previous savings (d_{t-1}) and any credit (C) made available to the student each year. Thus, for $t \in \{1, \dots, S\}$,

$$y_t + C_t + d_{t-1} = k_t + c_t + d_t \quad (3.2)$$

In the second period, the payback period, consumption is limited by the proportion of income that must be devoted to repaying student loans. For simplicity, I assume that all loans were made at a single interest rate. I also abstract from the complexities of compounding interest on decreasing balances by setting the yearly

³⁶ c_T represents consumption throughout retirement.

payment equal to the interest rate ($\rho=1+r$) multiplied by the sum of the loans, divided by the number of years in the payback period³⁷. It follows that for $t \in \{S+1, \dots, P\}$,

$$y_t + d_{t-1} = p_t + c_t + d_t \quad (3.3)$$

$$\text{where } p_t = \frac{\rho \sum_{j=1}^S C_j}{P - S}.$$

In the third period, after paying back the loans, income may be spent freely.

Thus, for $t \in \{P+1, \dots, T\}$

$$y_t + d_{t-1} = c_t + d_t \quad (3.4)$$

Equations (3.1) through (3.4) define the net present utility of a given choice. Note that all the variables in the budget constraints (except S , P , and T , which by assumption are independent of schooling location) are influenced by the choice of where to study. We can combine these into a single equation representing lifecycle utility (3.5):

$$V_l = \sum_{t=1}^S \delta^t U(y_t + C_t + d_{t-1} - k_t - d_t, l_t) + \sum_{t=S+1}^P \delta^t U(y_t + d_{t-1} - p_t - d_t, l_t) + \sum_{t=P+1}^T \delta^t U(y_t + d_{t-1} - d_t, l_t) \quad (3.5)$$

The student will choose to study abroad if and only if $V_l > V_0$ (where l indicates study abroad). The returns to education depend on where the education was obtained and where the graduate lives during employment; these returns appear in earnings at each subsequent time period. Note that the return to education is not necessarily equal to the interest rate (Cameron and Taber, 2000; Kodde, 1986). Given that the costs involved in study abroad—both tuition and living expenses—generally exceed the costs of domestic

³⁷ This approximates the way student loan repayment works in practice.

study, and that being far from home for an extended period of time is generally associated with disutility (psychic costs), going abroad can be justified only by higher lifecycle earnings.³⁸ Therefore, I postulate that at least one of two conditions holds:

Proposition 3.1. Those who have studied abroad have higher starting wages (y_{S+1}) than do those who have not.

Proposition 3.2. Those who have studied abroad enjoy higher income growth than do those who have not.

These two propositions, applied to graduate school, are illustrated in Figure 3.1³⁹: panel (a) represents Proposition 3.1, while panel (b) represents Proposition 3.2. In each, the solid line is the (undiscounted) “disposable income” path corresponding to studying a master’s degree abroad, while the dotted line corresponds to pursuing the same degree in Mexico. I define disposable income as income (including gifts) plus any credit, minus obligatory payments such as tuition, living expenses, and loan repayment.⁴⁰ Each section of the income path corresponds to one of the summation signs in (3.5).⁴¹ In order for the student to be induced to study abroad, those who study abroad must enjoy either a higher

³⁸ As mentioned previously, the psychic costs for short-term study abroad programs in high school and college may be overcome by the novelty of going abroad; therefore the returns to study abroad at those levels may be low or nil.

³⁹ Figure 1 is an adaptation of Figure 3.3 in Filer *et al.* (1996).

⁴⁰ I am abstracting from the possibility of loan default, which is very real in Mexico, as in the United States.

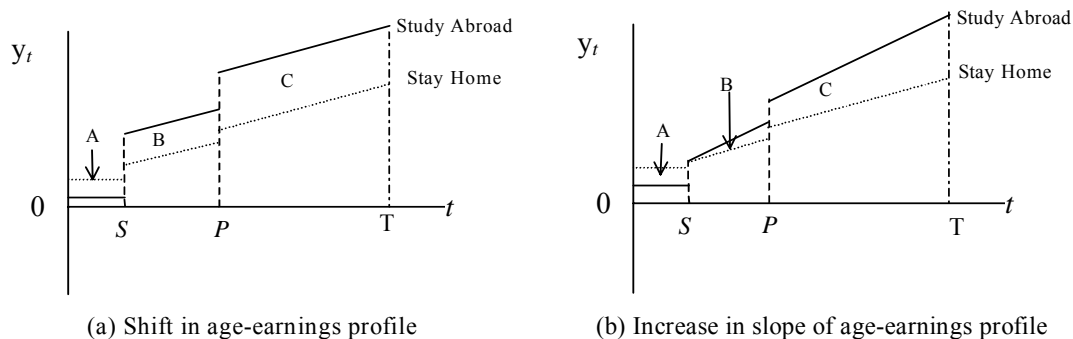
⁴¹ During the schooling period, I have drawn the “Stay Home” line above the “Study Abroad” path because (1) tuition is probably lower, (2) there are greater possibilities of working, and (3) living expenses are likely to be lower, especially for students who still live with their parents. For simplicity, I have assumed that the payoff period is independent of the study location. During the payoff period, either path may be above the other, depending on the size of loans necessary for study in each place.

starting wage after graduation than their domestic-study compatriots (panel a) or faster income growth (panel b), or both.

If the schooling location decision is based on income incentives only, the student will evaluate (with time-preference discounting) the sum $(A + B + C)$. If this sum is positive, he will study abroad. Otherwise, he will not.

It is important to recognize that $B + C > A$ does not guarantee study abroad. If the discount factor δ is sufficiently large or the payoff period B sufficiently long (and if B is either negative or small and positive), then study abroad is no longer attractive, even if it reaps higher income in the long run (large C). Conversely, a large early positive difference may be enough to overcome long-term negative returns. Thus, two observably identical individuals may make different decisions because their rates of time preference (which we generally cannot observe) differ.⁴²

Figure 3.1. Possible positive effects of studying abroad, compared to staying in the home country to study.



Labor markets. The economic benefits of study abroad arise in the context of labor markets. In order for those who study abroad to earn more than those who stay in

⁴² The uncertain economic atmosphere prevailing in Mexico since 1982 is suggestive of a large δ ; I know of no studies to confirm this, however.

the home country, study abroad must be associated with skills or knowledge that command higher wages in the local market due to the relative positions of demand and supply (Becker, 1994; Heckman et al., 1996). For example, along the northern border of Mexico, the demand for English skills is high, but so is the supply of workers with a working command of English. In the notation of the model summarized by equation (3.5): y_t is a function of l_t .

The demanded skills may be acquired while abroad (a productivity effect) or may be inherent characteristics of people who tend to go abroad (a signal effect). As Mexico has become increasingly internationally-oriented since signing the GATT in 1985, the demand for related skills and knowledge has grown. At the same time, the supply has increased, as every year more Mexicans go abroad temporarily for leisure, study, and work. Although we do not have data on local demand for and supply of such specific skills, we can postulate that:

Proposition 3.3. The study abroad wage differential depends on place of residence within Mexico.

Weaning. Individuals who choose to study abroad may also have lower psychic costs in separating themselves from traditional ties. Even if, before going abroad, their locational preferences were identical to those of students staying in Mexico, these preferences may be endogenous. That is, having already spent a year or more away from home may reduce the negative externality of living far from family (Mincer, 1978): $U(l_t)$ may be a function of $l_{t,j}$, for $j \geq 1$. Thus:

Proposition 3.4. Students who did not live with their parents during their undergraduate studies are more likely to pursue higher degrees abroad than are those who did live with their parents, *ceteris paribus*.

Proposition 3.5. Those who study abroad are more likely than are those who study domestically to migrate internally.

Ability. It is generally accepted in the economics of education literature that more able students may be more efficient at reaping the benefits of additional human capital. An extension of this argument is that more able students benefit more from study abroad. There are two reasons for this. The first is selectivity: the more able the student, the higher the quality of foreign (and domestic) universities to which he is admitted. Second, more able students will learn and retain skills and knowledge better than less able students. This leads us to

Proposition 3.6. More able students have higher earnings incentives to study abroad.

Scholarships and loans. There are many scholarship and low-interest loan programs available for study abroad at the graduate level. In general, these are conditioned on ability, as measured by grades, performance on standardized exams, or admission to programs of a particular caliber. Thus, for the very best students, a large wage differential may not be necessary for them to study abroad. For the most part, it is

the quality of foreign programs that attracts them: they are seeking academic excellence or prestige (or both).

Some scholarships are available to those willing to commit themselves to a particular kind of employment in the period immediately following graduation. The most important such case is CONACyT's Repatriation Program, under which past loans are forgiven if the graduate returns to Mexico and teaches at the college level for a specified period. Since teachers and professors generally earn less than do graduate-degree holders outside academics, this has the same effect on "disposable income" as a high interest rate; the payoff period is the time during which the graduate must work for academic wages only. Certain firms provide scholarships for their employees, on the condition that a certain period be spent in the firm after completing the degree. In this case, according to standard theory on general skills acquisition, the employee must suffer a lower wage than she would command in the market, until the firm is reimbursed the cost of the degree. Both of these effects, which may apply for graduate and "other" studies, might contribute to a small wage differential, at least in the short run. Unfortunately, the data do not contain information on scholarships or loans used for graduate studies. The effect, however, is similar to that of a payback period for loans, already captured in the model.

Parental background. Wealthier parents may pay their children's tuition, effectively reducing the interest rate (ρ) and the payoff period ($P-S$) to zero. This allows the graduate to enjoy the full benefits of study abroad sooner. Such a student requires lower incentives to study abroad. Thus, we might expect the post-graduate earnings differential to be smaller for individuals from upper-class backgrounds. On the other hand, children of wealthy families may have more ready access to the best positions, if

hiring is not based purely on merit. This effect may counter the other. Thus, it is difficult to predict the impact of parental background on earnings, but

Proposition 3.7. Family wealth has a positive impact on the decision to study abroad, all else equal.

Mastery of other languages. One specific benefit of study abroad (for most students) is improved command of the foreign language. To the extent that the study abroad earnings differential is related to language skills, including language fluency in earnings regressions should reduce the coefficients on the study abroad variables.

3.3.2 A note on study abroad earlier in life

When students spend part of their childhood in foreign schools, this is usually because their parents are abroad for some reason. Study abroad at the elementary school level is not usually based on an explicit expectation of higher earnings later in life. Therefore, such incentives are not necessary. Nevertheless, the experience may generate benefits: living abroad at a young age enables the child to develop near-native fluency and a deeper cultural understanding than does time abroad later in life.

At the high school and college levels, study abroad is often undertaken as a cultural experience, rather than with an eye for future benefits. The stay is generally shorter and the learning less profound than at an earlier age or during graduate school. While language skills are certainly improved, the largest expected benefit of study abroad at these levels might be an inclination to repeat the experience in later school or employment, either of which may have a more direct effect on lifetime earnings.

Thus, for those who have studied abroad before graduate school, the same labor market effects apply, but the choice involved is less intimately tied to possible labor market outcomes. At the same time, the quality of education is a less important choice factor before graduate study than during graduate school.

3.3.3 The empirical models

In order to test the propositions laid out in section 3.3.1, I estimate three types of models: a logit model on study abroad, a wage regression model, and a set of logits for possible impacts of study abroad on other outcomes.

3.3.3.1 Determinants of study abroad

To address the question, “Who studies abroad?”, I run a series of logit models. The dependent variable in each regression is one of the study abroad dummies. Propositions 6 and 7 instruct us to include, respectively, GPA and family background variables in estimating the probability of study abroad. Each regression also includes gender, public school dummies, GPA, father’s education level dummies, mother’s education level dummies, and study abroad that precedes the dependent variable. For college and graduate study abroad, college major (dummies for business- or engineering-related majors) is also included. In order to test Proposition 3.4 (those who did not live with their parents during college are more likely to go abroad during graduate school), the variable **resparents** is included.

3.3.3.2 Determinants of earnings

Propositions 1, 2, 3, and 6 are tested with regressions on earnings. The wage regression model is, in essence, a Mincer approach, with lessons drawn from Heckman *et al.* (1996) and Wachtel (1976). The basic equation is

$$y = \alpha + X'\beta + l'\gamma + s'\kappa + g'\lambda + u \quad (3.6)$$

where y is the natural log of compensation (earnings plus benefits) and l is a vector representing, respectively, spending time abroad during elementary school, high school, college, graduate school, other schooling or courses, and employment (to test Proposition 3.1). The vector s consists of l interacted with experience; the corresponding coefficients are estimates of the influence of going abroad on the slope of the age-earnings profile⁴³ (to test Proposition 3.2). The vector g is a vector of l interacted with **GPA70** and **GPA90**, yielding estimates to test Proposition 3.6 (ability and study abroad are complements). X is a vector of standard personal characteristics, and u is an error term assumed to be distributed randomly and uncorrelated with the covariates. I do not have data on tuition, so direct costs are not included in the estimation.⁴⁴

Some idiosyncrasies in X should be clarified. Of course, gender, marital status, and experience and its square are included. Rather than years of schooling, I use a set of dummies indicating levels of schooling (Wachtel, 1976)—college only (the excluded category), master’s degree, and doctorate—to allow for nonlinear schooling effects. Father’s education level and mother’s education level (also series of dummies) are used as proxies for family wealth (Mincer, 1994). College GPA is included as a proxy for ability⁴⁵ (Jones and Jackson, 1990; Wise, 1975). I also include participation in extra-curricular activities as a measure of sociability (Bartlett and Miller, 1985; Duncan and

⁴³ Technically, it gives us the effect on the slope of the experience-earnings profile. I chose to interact the abroad variables with experience instead of age because this gives us a truer measure of how foreign experiences impact productivity growth.

⁴⁴ Carneiro and Heckman (2002) have argued against tuition as an instrument for schooling quality.

⁴⁵ Although grade point average is not standardized, it captures the interaction between ability and responsibility, possibly serving as a better predictor of work performance than standardized exam results.

Dunifon, 1998; Mueser, 1977). Dummies for having attended public school at the elementary, secondary, and high school levels are included because the public/private school choice indicates wealth and may directly affect later outcomes such as graduate school attendance (Evans and Schwab, 1995).

By Propositions 1 and 2, either the γ or the κ values (or both) must be positive. Positive γ s indicate upward shifts in the age-earnings profile derived from having gone abroad. This shift may be the result of higher productivity at the beginning of one's career, a signal effect, or unobserved differences between the two groups of workers. If the κ values are greater than zero, then workers who have spent time abroad are able to increase their productivity more quickly than are those who have not. Such a phenomenon may be due to skills or values acquired while abroad, which have a lasting, remunerated effect on performance and behavior. Negative κ values, on the other hand, may indicate that skills, knowledge, or attitudes acquired abroad are lost over time or become obsolete; alternatively, they may signify that a disillusion occurred after a false signal was attributed to study abroad.

My model is similar to Friedberg's (2000), but with two important differences. First, I do not have years spent abroad; rather, I have a set of dummies indicating having been abroad at various educational levels and in employment.⁴⁶ Second, I control for language skills, while Friedberg does not. Since the workers in my sample are native Spanish speakers, at issue is the use of English and French on the job, not the ability of immigrants to communicate. Even so, it is important to separate language skills from

⁴⁶ My specification, then, is closest to Friedberg's equation (9).

other benefits of time spent abroad. When language is omitted, the coefficients on study abroad variables may capture any benefits derived from language abilities and thus be biased upwards.

Heckman *et al.* (1996) emphasize that the schooling location and the place of residence during employment interact: migrants tend to earn more than similar non-migrants. I include several variables to indicate mobility in order to take this into account. (Note, however, that this is not an estimate of the value of migration: by the nature of the regression, immigrants to a particular area are compared with non-mobile residents of the same area, not with those who stayed in the place of origin of the mobile workers.) In addition, two sub-samples are estimated separately: one for the three largest cities and another corresponding to the rest of Mexico; comparing the coefficients in these regressions enables me to test Proposition 3.3.

3.3.3.3 Effect of study abroad on other outcomes

I run a series of logit models in which the independent variables include I and the dependent variables are, in turn: attending graduate school, completing a master's degree, unemployment, and mobility. The hypotheses tested are that study abroad contributes to attending and completing graduate school; that those who have studied abroad are less likely to suffer unemployment; and that study abroad participants are more mobile than domestic-only students (Proposition 3.5).

3.4 Results

The results of econometric analysis are presented in this section in three parts. First I examine the factors that contribute to the probability of studying abroad at various times or of working abroad. Having determined who goes abroad, I turn to evaluating the

marginal contribution to earnings of the foreign experience. Finally, I attempt to identify the role played by foreign experience in other outcomes: probability of unemployment, probability of pursuing higher degrees, and propensity to move. These, in turn, influence the age-earnings profile and, therefore, represent an indirect channel through which study abroad may be compensated.

3.4.1 Who goes abroad?

Table 3.4 contains the results from logit regressions in each of which the dependent variable is some type of study abroad or work abroad. The dependent variables include previous study abroad, where appropriate.

3.4.1.1 Early education

Before high school, those who study abroad are probably with their parents. Therefore, we expect more randomness regarding ability but perhaps less with respect to family background. Indeed, we find that college GPA is unrelated to early study abroad, while place of birth has a significant impact on attending foreign elementary or secondary school. In light of Table 3.1, not going abroad early is logical for the sedentary city-dwellers.

Table 3.4. Determinants of going abroad: elementary school through college

	Elementary		High School		College	
	Coefficient	p-value	Coefficient	p-value	Coefficient	p-value
Female	-.4509	0.298	-.2438	0.478	-.0879	0.842
Class of 1976	-.2937	0.637	-.1306	0.812	-.9766	0.153
Class of 1986	.0742	0.879	.1180	0.765	-2.8378	0.001
Scholarship	-.9803	0.044	.1890	0.626	-.1171	0.786
GPA70	.5292	0.227	.6693	0.132	-.3453	0.686
GPA90	.3849	0.445	.6882	0.105	1.2959	0.004
Moved before college	.1040	0.813	.2869	0.386	-.1961	0.664
Born in city	-.8777	0.062	-.3479	0.327	.4933	0.221
resparents	-.4044	0.380	-.0981	0.804	-1.4332	0.001
public elementary	2.4408	0.027	1.1950	0.034	-.3876	0.564
public secondary	.2320	0.727	.0311	0.953	1.5993	0.031
public high school	-.3174	0.486	.7585	0.106	-.5819	0.178
father high school	.4739	0.552	-1.7121	0.119	-.5819	0.178
father college	.6485	0.239	.0944	0.811	-.0843	0.915
father MA	.6898	0.301	.0126	0.982	.3143	0.595
father Ph.D.	1.3239	0.192	-.9498	0.469	1.3440	0.104
mother high school	.8510	0.052	.3646	0.416	-.6564	0.320
mother college	-.8627	0.171	.6702	0.092	.2262	0.608
mother MA	.1317	0.916	p.f.p.		-1.3340	0.514
mother Ph.D.	.9329	0.467	.6882	0.432	p.f.p.	
SAbasic			1.8831	0.001	1.1931	0.173
SAhighschool					.5965	0.493
Sacollege						
SAbasic × GPA70			-.8101	0.380	.8467	0.601
SAbasic × GPA90			-1.6197	0.248	1.9824	0.326
SAhighschool × GPA70					p.f.p.	
SAhighschool × GPA90					.4021	0.755
Sacollege × GPA70						
Sacollege × GPA90						
Constant	-4.8308	0.000	-4.6961	0.000	-3.1505	0.000
N	623		606		604	
Likelihood	-117.5196		-162.5205		-109.6321	
Pseudo R2	0.1627		0.1187		0.2273	

Notes: p.f.p. = predicts failure perfectly. All regressions run with robust standard deviations.

Those who would eventually receive scholarships in college are even less likely to have studied abroad early on, reflecting family wealth as a determinant of (or result of) the family going abroad early in the child's life.⁴⁷ Parental education is at least somewhat

⁴⁷ The database contains more detailed information on financial aid types: merit awards, GPA-conditioned loan-scholarships, and simple loans. Those who received loans or merit scholarships did not study abroad before high school; when specific regressions are estimated, the coefficient on loan-scholarships is negative but insignificant. For high school foreign exchange, all three coefficients are insignificant. Those who received loans did not participate in study abroad during college; the coefficient on merit scholarship is

positively related to this outcome, but it is not clear whether this is because the parents were pursuing studies while abroad, or because the foreign jobs required higher levels of education, or for some other reason. The positive coefficient on public school attendance is possibly due to the fact that those who studied abroad generally attended public schools while abroad.

3.4.1.2 High school

The main determinant of going abroad during high school is having been abroad previously. The significant, positive coefficients on public school attendance at the elementary and high school levels probably are related to the fact that most high school study abroad takes place in public schools. Of the parental education dummies, only that corresponding to the mother having a college education is strongly and positively associated with study abroad during high school.

3.4.1.3 College

Study abroad during college is influenced by many more factors than earlier study abroad. Recent graduates are the most likely to have studied abroad; the large, significant, negative coefficient on the Class of 1986 may be related to the economic crisis that began in 1982. As expected, more able students have a higher propensity to go abroad during college, in part due to minimum GPA requirements for participation.

positive and significant at the 0.05 level (1.7210, 0.029); the coefficient on loan-scholarships is negative but insignificant. For “other courses”, all three coefficients are negative; that on loan-scholarships is significant (-.4161, 0.060). For graduate study abroad, merit scholarship recipients were more likely to go abroad (3.5504, 0.004); the other two coefficients are positive but insignificant. Among those who completed a master’s degree, all who had received a merit scholarship during college went abroad for graduate studies; the other two coefficients are negative but insignificant. Work abroad is not significantly related to any of the specific financial aid variables.

Those who lived with their parents during college were less likely to study abroad. The two may be linked to budget constraints or to a resistance to leaving the nest. The positive coefficient on public secondary school attendance is a mystery. Parental education levels have no predictable influence on study abroad during college. Although having been abroad previously has no direct influence on college study abroad, the combination of study abroad during high school and low college grades is associated with a zero probability of going abroad during college.

3.4.1.4 Graduate school

Table 3.5 contains the results of logit regressions in which the dependent variable is, in turn: the probability of having studied abroad at the graduate level (even if the master's degree was not completed); the probability of completing a master's degree with at least some study abroad included; and the probability of having studied abroad at the graduate level, given that the master's degree has been completed.

Graduates from earlier classes are more likely to have studied abroad, but this is largely because they are also more likely to have pursued graduate study, as they have had longer to do so: among those who have completed a master's degree, graduates of earlier classes are not significantly more likely to have a foreign diploma. Scholarship recipients who continue their studies are less likely than are non-recipients to do so abroad. Although college grades are a strong determinant of graduate study abroad, when we limit the sample to those with a master's degree this is not true. There is no strong support of Proposition 3.4 (undergraduate separation from family associated with graduate study abroad).

Table 3.5. Determinants of going abroad: graduate school

	Started graduate program abroad		Completed foreign graduate program		Graduate abroad, given MA completed	
	Coefficient	p-value	Coefficient	p-value	Coefficient	p-value
Female	-.7538	0.261	-1.4914	0.138	-.4259	0.648
Class of 1976	3.3548	0.000	2.8118	0.000	.6246	0.541
Class of 1986	1.9831	0.003	1.6099	0.027	.0050	0.996
Scholarship	.1613	0.766	-.0861	0.886	-1.3851	0.053
GPA70	.2171	0.785	-.1968	0.845	.4095	0.743
GPA90	1.1504	0.043	.9478	0.149	1.0126	0.192
Moved before college	.2671	0.583	.1345	0.819	.5871	0.442
Born in city	.0450	0.937	.7341	0.168	.2200	0.807
resparents	.0145	0.980	-.4190	0.422	.3826	0.697
public elementary	.4435	0.560	.4222	0.592	1.5317	0.234
public secondary	-.7745	0.305	-1.3140	0.110	-2.5866	0.039
public high school	.2494	0.599	.0460	0.932	.7371	0.288
father high school	1.1045	0.112	.9893	0.174	1.5862	0.067
father college	.4613	0.356	.2808	0.636	.4101	0.591
father MA	.7014	0.334	.6549	0.421	.2685	0.795
father Ph.D.	2.7855	0.036	3.5166	0.013	p.s.p.	
mother high school	-1.6598	0.115	-.9962	0.260	-.4816	0.617
mother college	-.3060	0.709	-.4695	0.608	-.0471	0.959
mother MA	p.f.p.		p.f.p.		p.f.p.	
mother Ph.D.	p.f.p.		p.f.p.		p.f.p.	
SAbasic	2.1988	0.004	1.9148	0.008	2.3229	0.070
SAhighschool	.1063	0.907	-.4938	0.712	.9652	0.534
SACollege	-18.3339	0.000	-18.7214	0.000	1.8638	0.661
SAbasic × GPA70	.6581	0.602	-.4848	0.744	-1.6282	0.385
SAbasic × GPA90	p.f.p.		p.f.p.		p.f.p.	
SAhighschool × GPA70	1.4331	0.270	2.6453	0.119	.4283	0.853
SAhighschool × GPA90	p.f.p.		p.f.p.		p.f.p.	
SACollege × GPA70	p.f.p.		p.f.p.		p.f.p.	
SACollege × GPA90	19.2084	.	19.8971	.	coll.	
Constant	-5.2931	0.000	-4.5860	0.000	-2.1024	0.090
N	581		581		101	
Likelihood	-88.8858		-74.5024		-43.6166	
Pseudo R ²	0.3136		0.2774		0.1951	

Notes: p.f.p. = predicts failure perfectly; p.s.p. = predicts success perfectly; coll. = dropped due to collinearity. All regressions run with robust standard errors.

Students whose fathers have higher levels of education, especially a doctorate degree, also have a higher propensity to pursue graduate studies abroad. Among those who completed a master’s degree, *all* those whose fathers had earned a Ph.D. chose to study abroad in graduate school. While for most students, having studied abroad before high school is associated with a higher probability of attending a foreign graduate

program, the same is not true for either the best or the worst students.⁴⁸ Having gone abroad during college reduces the probability of doing the same in graduate school for all but the best students.

3.4.1.5 Other courses

Table 3.6 contains regression results for logit models in which the dependent variables are “other courses” and work abroad. “Other courses” are usually completed after college, but in some cases are summer courses (for example, languages) taken before or during college. Because many of these classes constitute training paid for by employers, it is difficult to predict the variables that might influence this outcome. The results reveal that, while ability is not a significant factor, scholarship recipients have a lower propensity to participate in this type of study abroad, perhaps reflecting a wealth effect. All those who participated in early study abroad and earned low college grades went abroad for at least one “other” course. No other study abroad variables seem to influence the decision to participate in this kind of course abroad. In general, the model does little to explain participation in these courses.

⁴⁸ When the interacted terms are omitted from the first regression, the coefficient on SABasic is 1.8975, with a p-value of 0.006. It is insignificant in the other two regressions.

Table 3.6. Determinants of going abroad: “other courses” and work

	Other courses		Work abroad	
	Coefficient	p-value	Coefficient	p-value
Female	.2607	0.206	-.8807	0.060
Class of 1976	.4772	0.105	.9932	0.038
Class of 1986	.2574	0.267	.9201	0.024
Scholarship	-.4608	0.026	.5293	0.166
GPA70	-.2985	0.300	-.1147	0.867
GPA90	.4155	0.112	-1.4853	0.089
Moved before college	-.1366	0.516	.5718	0.120
Born in city	.0225	0.926	-.0066	0.987
resparents	-.3567	0.141	.0489	0.909
public elementary	.4680	0.129	-.4796	0.308
public secondary	-.0417	0.889	.7039	0.133
public high school	.1565	0.450	.3355	0.360
Father high school	.1860	0.614	-.5355	0.484
Father college	-.0751	0.745	-.0209	0.956
Father MA	-.1840	0.544	-.2112	0.739
Father Ph.D.	-1.1524	0.078	-.3746	0.791
Mother high school	.0698	0.787	-.6522	0.231
Mother college	.4909	0.037	-1.2446	0.078
Mother MA	.5724	0.275	-.0208	0.986
Mother Ph.D.	.1579	0.870	p.f.p.	
SAbasic	-.1918	0.708	.3316	0.708
SAhighschool	.0190	0.965	.5368	0.427
SACollege	-.3694	0.536	.0736	0.947
SAother	--		.3278	0.451
SAbasic × GPA70	p.s.p.		.3576	0.797
SAbasic × GPA90	-1.6054	0.184	p.f.p.	
SAhighschool × GPA70	.8763	0.292	.0141	0.989
SAhighschool × GPA90	.1014	0.900	-1.3964	0.290
SACollege × GPA70	.9711	0.515	1.6319	0.386
SACollege × GPA90	.4390	0.609	2.8072	0.054
SAother × GPA70	--		-.0222	0.983
SAother × GPA90	--		1.7932	0.084
Constant	-1.0096	0.001	-3.4093	0.000
N	613		611	
Likelihood	-381.1388		-140.5531	
Pseudo R2	0.0447		0.1388	

Notes: p.f.p. = predicts failure perfectly; p.s.p. = predicts success perfectly; coll. = dropped due to collinearity. All regressions run with robust standard deviations.

3.4.1.6 Work abroad

Women are much less likely than men to have worked abroad, as are the best students in this sample (with the exception of good students who have also studied abroad early, in college, or for other courses). The former is a cultural result, while the latter is more difficult to explain. Higher parental education reduces the probability of foreign

employment. This is possibly a result of selection: wealthier students who have worked abroad may have stayed abroad, and thus been excluded from this study. The significant positive coefficients on the two class dummies make sense because these individuals have had longer than recent graduates to take advantage of foreign opportunities, either as part of employment in a multinational firm, or as temporary emigration in a life-cycle context.

3.4.1.7 Summary

In summary, those who study abroad early are likely to repeat the experience at a higher level. Wealth plays an important role in the decision to study abroad, with wealthier individuals tending to make this choice more often than their less fortunate classmates. Ability is a strong determinant of study abroad at the college level and above, especially when combined with previous foreign experience. This may be, at least in part, due to minimum grade requirements at foreign universities and financial aid that is tied to ability.

3.4.2 Does study abroad contribute to higher earnings?

In this section, I analyze the effect on compensation of studying or working abroad at various points in time using the model in equation (3.6). I begin by analyzing the importance of language skills, both to the individual and to the econometrician. Once that is established, I turn to the impact of study abroad on earnings while controlling for language. For this purpose, I use first a single variable comprised of all study abroad, and then variables corresponding to the several types of study abroad.

For the analysis in this section, the sample is divided into two groups: the most recent graduates (Class of 1996) and previous graduates (Classes of 1976 and 1986).

Because only two years had passed since graduation for the most recent graduates before the survey was taken, this division amounts to analyzing the impact on entry wages and long-term earnings effects. There are other justifications for splitting the sample. Recent graduates have not had time to complete graduate studies, especially if these were delayed to allow for a period of employment. The increase in globalization and accompanying emphasis on international affairs in the curriculum between 1986 and 1996 also places the new graduates in a class of their own. Finally, the recent graduates constitute two-thirds of the sample and might bias long-term income estimates.

3.4.2.1 Foreign languages

Tables 3.7 through 3.10 provide the results of regressions on real earnings using the most comprehensive study abroad variable (**abroad**). Tables 3.9 and 3.10 include measures of English and French fluency. For the Class of 1996, the languages have little effect. This is probably because 60% of the class rates itself between 3 and 4 in English, leaving little variance, and relatively few students have a strong mastery of French. Likewise, the coefficients on study abroad are almost imperceptibly affected by the inclusion of languages. For the previous classes, however, language proficiency is more important. Here, when languages are included, the coefficients on study abroad change, suggesting that the exclusion of languages in long-term income regressions may result in biased estimates of the value of foreign human capital.

Table 3.7. Study abroad as determinant of earnings, without languages, Class of 1996

	Whole sample		Three largest cities		Rest of Mexico	
	coefficient	p-value	coefficient	p-value	coefficient	p-value
abroad	1.6104	0.004	.9411	0.220	2.0669	0.057
abroad × experience	-.5151	0.011	-.2932	0.309	-.6755	0.151
abroad × GPA70	-.0264	0.893	-.0568	0.809	.1599	0.806
abroad × GPA90	-.1665	0.354	.0275	0.892	-.5716	0.371
female	-.2300	0.018	-.3061	0.007	-.1244	0.683
age	-1.1410	0.004	-1.6717	0.021	-1.0775	0.333
age ²	.0235	0.001	.0337	0.016	.0228	0.246
experience	.9416	0.141	.6457	0.435	2.1559	0.126
experience ²	-.0598	0.680	.0032	0.986	-.3752	0.282
ECAcult	-.1120	0.214	-.0953	0.405	.2512	0.453
ECAphys	.0540	0.554	.1101	0.359	-.1882	0.504
ECApol	.1199	0.125	.0910	0.333	.3135	0.164
Business major	-.1218	0.292	-.1300	0.395	.0342	0.914
Engineering major	-.1335	0.117	-.2205	0.082	-.0103	0.973
MA	.3409	0.016	.4756	0.001	-.1262	0.801
GPA70	.0707	0.539	.1636	0.306	-.1135	0.701
GPA90	.1206	0.370	.0062	0.969	.2924	0.542
public elementary	-.1112	0.379	-.1477	0.391	.0623	0.912
public secondary	.1516	0.294	.1430	0.452	.0796	0.840
public high school	.1154	0.175	.1008	0.324	.2352	0.429
hours	.0090	0.194	.0051	0.492	.0418	0.042
single	-.2961	0.013	-.3077	0.050	-.0449	0.830
parents' residence moved	.2227	0.023	-.1828	0.484	.0283	0.942
father high school	-.0594	0.727	-.0482	0.809	-.1428	0.799
father college	.0482	0.682	.0159	0.898	.0844	0.839
father MA	.0309	0.831	-.0102	0.947	-.1240	0.740
father Ph.D.	-.2926	0.376	-.1404	0.750	-.4657	0.406
mother high school	-.147	0.259	-.2473	0.187	.0382	0.894
mother college	.0340	0.722	.0594	0.603	.1324	0.655
mother MA	.2782	0.249	.4019	0.199	.4500	0.217
mother Ph.D.	.2753	0.047	.2692	0.164	.6918	0.046
constant	13.4825	0.011	21.4290	0.025	9.2384	0.556
N	207		145		62	
R ²	0.3577		0.4028		0.5586	
Ramsey RESET test	0.2449		0.2680		0.9071	

Notes: dependent variable is log of real earnings. All regressions run with robust standard deviations.

Table 3.8. Study abroad as determinant of earnings, without languages, Classes of 1976 and 1986

	Whole sample		Three largest cities		Rest of Mexico	
	coefficient	p-value	coefficient	p-value	coefficient	p-value
abroad	1.3152	0.008	1.1151	0.040	1.3480	0.226
abroad × experience	-.0859	0.002	-.0558	0.074	-.0968	0.114
abroad × GPA70	.0010	0.998	-.5438	0.171	.9495	0.309
abroad × GPA90	.1294	0.752	.2602	0.569	-.2250	0.886
female	-.4282	0.051	-.2575	0.442	.0805	0.849
age	.3058	0.265	.6017	0.032	-.5084	0.702
age ²	-.0038	0.240	-.0063	0.051	.0046	0.792
class of 1976	-.2926	0.676	-1.6287	0.067	4.1829	0.014
experience	.4353	0.023	.5158	0.043	.4502	0.327
experience ²	-.0097	0.077	-.0113	0.101	-.0170	0.217
ECAcult	-.0205	0.914	.1269	0.565	-.1516	0.683
ECAphys	.0504	0.758	.3908	0.053	-.4563	0.230
ECApol	.4618	0.002	.0753	0.687	.6863	0.028
Business major	.2031	0.394	.2902	0.358	.2707	0.609
Engineering major	.1432	0.535	.2880	0.333	.6565	0.193
MA	.1563	0.279	.2109	0.212	-.1523	0.675
Ph.D.	-.2472	0.360	-.3199	0.486	-.6319	0.343
GPA70	.0941	0.736	.3661	0.167	-.4457	0.480
GPA90	.0815	0.818	.0360	0.930	-.5596	0.687
public elementary	.0967	0.667	-.1813	0.501	.2296	0.660
public secondary	.2343	0.247	.2829	0.225	-.0494	0.908
public high school	-.2279	0.121	.0669	0.732	.0639	0.880
hours	.0214	0.352	.0317	0.274	-.0120	0.570
single	-.4915	0.025	-.7563	0.006	-.7234	0.052
parents' residence moved	.3273	0.040	-.0506	0.865	-.5327	0.201
father high school	.1632	0.305	-.2553	0.295	.3717	0.239
father college	.5431	0.104	.9864	0.030	-.2661	0.621
father MA	.0892	0.577	.1001	0.621	-.1571	0.631
father Ph.D.	-.0171	0.940	.3880	0.173	-.5677	0.571
mother high school	.1489	0.764	.7041	0.016	-2.4235	0.016
mother college	.2313	0.272	-.1565	0.561	.9701	0.069
mother MA	-.1303	0.684	.0868	0.850	.1550	0.789
mother Ph.D.	-.1609	0.713	-.4575	0.485	-.0833	0.932
constant	--	--	--	--	--	--
constant	-8.3820	0.177	-16.6185	0.015	12.1120	0.646
N	160		101		59	
R ²	0.4236		0.5642		0.6676	
Ramsey RESET test	0.6668		0.3495		0.7959	

Notes: dependent variable is log of real earnings. Regressions were run with robust variance to account for heteroskedasticity.

Table 3.9. Study abroad as determinant of income, with languages, Class of 1996

	Whole sample		Three largest cities		Rest of Mexico	
	coefficient	p-value	coefficient	p-value	coefficient	p-value
abroad	1.6162	0.003	.9834	0.190	2.1753	0.032
abroad × experience	-.5238	0.008	-.3124	0.267	-.7051	0.108
abroad × GPA70	-.0192	0.923	-.0472	0.843	.1714	0.790
abroad × GPA90	-.1804	0.339	.0102	0.961	-.6404	0.501
English	.0554	0.498	.0922	0.286	-.0685	0.857
French	.0884	0.181	.1116	0.125	-.0260	0.926
female	-.2295	0.018	-.3083	0.006	-.1539	0.617
age	-1.0596	0.005	-1.4937	0.030	-1.1381	0.325
age ²	.0220	0.002	.0301	0.023	.0239	0.239
experience	1.0379	0.109	.9392	0.239	2.2009	0.132
experience ²	-.0780	0.597	-.0524	0.761	-.3833	0.288
ECAcult	-.1164	0.199	-.0964	0.418	.2832	0.393
ECAphys	.0533	0.564	.1128	0.345	-.1574	0.597
ECApol	.1151	0.142	.0811	0.392	.2982	0.192
Business major	-.0900	0.444	-.0708	0.647	.0430	0.893
Engineering major	-.1134	0.263	-.1811	0.165	-.0193	0.953
MA	.2778	0.064	.4012	0.007	-.1238	0.809
GPA70	.0814	0.475	.1954	0.210	-.1088	0.719
GPA90	.0981	0.464	-.0093	0.952	.3788	0.565
public elementary	-.1134	0.374	-.1541	0.377	.0610	0.923
public secondary	.1546	0.293	.1623	0.411	.1075	0.818
public high school	.1017	0.248	.0822	0.436	.2356	0.446
hours	.0086	0.212	.0056	0.466	.0418	0.055
single	-.2855	0.017	-.3041	0.060	-.0474	0.836
parents' residence moved	.2227	0.026	-.1542	0.530	.0573	0.900
father high school	.1272	0.178	-.2342	0.329	.2800	0.404
father college	-.0313	0.857	-.0293	0.881	-.1284	0.828
father MA	.0659	0.854	.0249	0.836	.0830	0.855
father Ph.D.	.0493	0.738	.0091	0.951	-.1082	0.810
mother high school	-.2713	0.403	-.0928	0.830	-.4587	0.427
mother college	-.1638	0.214	-.2520	0.182	.0754	0.776
mother MA	.0029	0.977	.0033	0.979	.1338	0.657
mother Ph.D.	.2635	0.282	.3715	0.255	.4463	0.239
constant	.3148	0.025	.3677	0.054	.7334	0.070
constant	12.1314	0.019	18.4451	0.041	10.1055	0.538
N	207		145		62	
R ²	0.3648		0.4149		0.5599	
Ramsey RESET test	0.1313		0.3220		0.7973	

Notes: dependent variable is log of real earnings. All regressions run with robust standard deviations.

Table 3.10. Study abroad as determinant of income, with languages, Classes of 1976 and 1986

	Whole sample		Three largest cities		Rest of Mexico	
	coefficient	p-value	coefficient	p-value	coefficient	p-value
abroad	1.2864	0.010	1.2275	0.020	1.8383	0.115
abroad × experience	-.0879	0.002	-.0750	0.019	-.1057	0.092
abroad × GPA70	.0383	0.920	-.4775	0.246	.3853	0.706
abroad × GPA90	.1311	0.755	.1977	0.648	-.8739	0.534
English	.1141	0.281	.4046	0.009	-.3421	0.186
French	.0164	0.932	.1596	0.557	-.4399	0.089
female	-.4061	0.068	-.0974	0.770	.2557	0.534
age	.2845	0.304	.5834	0.030	-.0133	0.993
age ²	-.0036	0.277	-.0061	0.051	-.0012	0.953
class of 1976	-.2898	0.677	-1.5425	0.052	3.8544	0.023
experience	.4245	0.033	.4955	0.075	.3873	0.420
experience ²	-.0093	0.105	-.0103	0.172	-.0149	0.307
ECAcult	-.0149	0.939	.0907	0.693	-.1714	0.645
ECAphys	.0355	0.829	.3931	0.045	-.2513	0.570
ECApol	.4555	0.002	.0386	0.829	.5849	0.054
Business major	.1767	0.466	.3359	0.259	.6015	0.312
Engineering major	.1108	0.629	.2464	0.348	.9474	0.068
MA	.1424	0.335	.1933	0.254	-.0928	0.817
Ph.D.	-.2152	0.588	-.4294	0.442	-.1996	0.732
GPA70	.0675	0.813	.3408	0.163	.0005	0.999
GPA90	.0609	0.866	.0026	0.994	.0152	0.990
public elementary	.1018	0.650	-.1267	0.620	.5350	0.295
public secondary	.2412	0.230	.2136	0.333	-.2913	0.489
public high school	-.2228	0.129	.1174	0.533	.1532	0.706
hours	.0226	0.345	.0306	0.292	-.0118	0.549
single	-.5000	0.025	-.8004	0.002	-.6665	0.089
parents' residence moved	.3210	0.049	.0098	0.973	-.6571	0.175
father high school	.1649	0.298	-.1522	0.524	.4533	0.167
father college	.5043	0.136	.8245	0.050	-.0416	0.940
father college	.0511	0.762	.0926	0.633	.1080	0.729
father MA	-.0291	0.901	.3559	0.266	-.3661	0.743
father Ph.D.	.0929	0.857	.6474	0.026	-1.9146	0.115
mother high school	.2200	0.305	-.2003	0.429	1.0470	0.085
mother college	-.1405	0.666	.0488	0.919	.3401	0.620
mother MA	-.2342	0.610	-.5886	0.380	.3431	0.789
mother Ph.D.	--	--	--	--	--	--
constant	-8.1737	0.191	-17.2640	0.008	2.2971	0.941
N	160		101		59	
R ²	0.4280		0.6076		0.7106	
Ramsey RESET test	0.7745		0.0840		0.7559	

Notes: dependent variable is log of real earnings. Regressions were run with robust standard deviations.

For 1976 and 1986 graduates living in the cities, an improvement of one level in English—for example from “good” to “very good”—is worth more than a master’s

degree, or almost one year of experience. French skills are also valuable, but less so than English.⁴⁹ Evidently, demand for language skills still exceeds supply in Mexico's largest cities. In the rest of the country, language skills are not associated with higher wages; in fact, proficiency in French has a significant negative impact on earnings. This very important difference supports Proposition 3.3: markets matter.

3.4.2.2 Study abroad in general

Because it is important to include foreign language skills when analyzing the impact of foreign human capital on earnings, I will focus on Tables 3.8 and 3.9 for this part of the discussion. Most of the controls behave as expected and most of the standard controls are significant at the 0.05 level or better. The coefficient on **abroad** tells us that those who have studied abroad generally earn more than do those who have not, confirming Proposition 3.1. This effect is stronger in the largest cities for earlier graduates, but in the rest of Mexico for the most recent graduates. Thus, for the most recent graduates, there is an entry-level wage premium on study abroad, but only outside the largest cities. These alumni may or may not continue to experience the higher wages as time goes by, despite the contemporary lack of a differential for graduates of previous classes. Likewise, the fact that recent graduates living in the cities enjoy no such premium may reflect a saturation of those markets with applicants fluent in English, or may indicate that a certain position must be attained in order for English fluency to warrant higher pay. The differences in coefficients between the city sub-samples and the

⁴⁹ Information on other languages is available in the data, but there were too few observations for those languages to gain estimates of their worth.

“rest of Mexico” sub-samples support Proposition 3.3 and merit a closer look. The results in the next section help to elucidate these differences.

The coefficient on the first interacted term (study abroad with experience) indicates that the benefits wear off over time, contradicting Proposition 3.2. In other words, going abroad does not provide students with skills that enable them to take advantage of training or other productivity-enhancing activities to a greater extent than those who stay at home throughout their studies. On the contrary, any valuable skills acquired abroad either become obsolete or are forgotten. This result is independent of location, and significant everywhere in the long-term income regressions (Table 3.10), but insignificant for short-term wages in the location-specific sub-samples (Table 3.9). There appears to be no strong relation between college grades and the impact of study abroad on earnings.

Using these coefficients, it is possible to estimate the average income for a person with certain characteristics. For example, a single, 24-year-old, male liberal arts graduate of the class of 1996 with average grades and two years of experience, who attended private schools before entering college and did not attend graduate school, whose parents both had a college education, and who had not participated in any extra-curricular activities during college, working full-time would earn \$5,404 pesos monthly if he had not studied or worked abroad and \$9,915 if he had.⁵⁰ A similar graduate of the class of 1986, but married and moved and with twenty-two years of experience, would earn \$60,459 without study abroad and \$76,245 with it. For a 1976 graduate, the experience-

abroad interaction (assumed to be linear) overtakes the positive effect of study or work abroad: the respective calculations are \$138,680 and \$72,586.

3.4.2.3 Specific types of study abroad

Underlying the positive coefficient on **abroad**, however, are the individual effects of five types of study abroad: elementary or secondary school (**SAbasic**), high school (**SAhighschool**), college (**SACollege**), graduate school (**SAGrad**), and “other” (**SAother**). The last category consists mainly of language courses and corporate-sponsored training. In this section, I examine three impacts of each type of study abroad on earnings by including three variables for each type of study abroad: the straight variable, an interaction with experience, and an interaction with GPA, as in equation (3.6). As Tables 3.11 and 3.12 demonstrate, the effects of study abroad vary by type and place, supporting Proposition 3.3.

Study abroad before high school is associated with lower earnings for recent graduates living in Mexico’s largest cities, but when interacted with experience, **SAbasic** has a significant positive coefficient for this same sub-sample. None of the remaining coefficients on **SAbasic** or **SAbasic** × **experience** is significant, and their signs are mutually contradictory.

⁵⁰ I assume that study or work abroad influences language abilities. Thus, the average levels by study abroad from Table 3.3 were used in these estimates. Full-time hours were set at 46 for both estimates.

Table 3.11. Specific types of study abroad as determinants of income, Class of 1996

	Whole sample		Three largest cities		Rest of Mexico	
	coefficient	p-value	coefficient	p-value	coefficient	p-value
SAbasic	-.0451	0.930	-1.0066	0.040	1.3024	0.478
SAhighschool	.6543	0.502	1.3041	0.293	-8.1437	0.174
SACollege	1.5317	0.002	.7427	0.341	1.1989	0.457
SAgrad	--		--		--	
SAother	.9250	0.066	.4444	0.569	1.2975	0.574
Work abroad	7.1919	0.156	1.1569	0.776		
SAbasic × experience	.2233	0.291	.4556	0.015	-.2796	0.684
SAhighschool × experience	-.2205	0.565	-.4803	0.332	3.6507	0.158
SACollege × experience	-.5288	0.004	-.1680	0.557	-.5213	0.380
SAgrad × experience	-.3013	0.281			-1.4079	0.243
SAother × experience	-.2833	0.118	-.0890	0.754	-.4355	0.648
Work abroad × experience	-2.2661	0.184	-.2656	0.851	.1866	0.455
SAbasic × GPA70	-.8608	0.025	-.2831	0.638	-1.2895	0.118
SAbasic × GPA90	--		--		--	
SAhighschool × GPA70	-.3566	0.405	-.4289	0.358	--	
SAhighschool × GPA90	-.3721	0.170	-.1069	0.742	-2.2429	0.188
SACollege × GPA70	.8682	0.047	--		--	
SACollege × GPA90	-.0170	0.956	--		.3282	0.700
SAgrad × GPA70	--		--		--	
SAgrad × GPA90	--		--		--	
SAother × GPA70	.1396	0.607	.1357	0.578	.7979	0.425
SAother × GPA90	-.0388	0.860	.0270	0.914	-1.0336	0.477
Work abroad × GPA70	-.3633	0.390	.3305	0.508	-.8171	0.196
Work abroad × GPA90	-1.8352	0.029	-.7192	0.197	--	
English	.0848	0.307	.0968	0.308	-.2489	0.625
French	.0910	0.157	.1038	0.181	.5546	0.324
female	-.2022	0.041	-.2648	0.027	-.6349	0.305
age	-.8546	0.018	-.8769	0.231	-1.3680	0.439
age ²	.0179	0.007	.0181	0.202	.0299	0.336
experience	1.1337	0.078	1.0719	0.274	2.5835	0.249
experience ²	-.1140	0.447	-.1026	0.631	-.5410	0.327
ECAcult	-.1166	0.209	-.0970	0.465	.4238	0.472
ECAphys	.0098	0.920	.0910	0.498	-.5226	0.185
ECApol	.1079	0.174	.0975	0.362	.4183	0.134
Business major	-.0242	0.840	-.0241	0.880	.1201	0.763
Engineering major	-.0730	0.497	-.0758	0.593	.0034	0.995
MA	.2626	0.084	.3459	0.093	.6161	0.354
GPA70	.0771	0.491	.1197	0.488	-.1027	0.814
GPA90	.1343	0.317	.0532	0.728	-.0195	0.984
public elementary	-.0156	0.909	-.0477	0.816	-.3625	0.665
public secondary	.0344	0.817	.0489	0.818	.4624	0.413
public high school	.0888	0.363	.1060	0.388	.2258	0.690
hours	.0077	0.234	.0042	0.573	.0478	0.228
single	-.3057	0.018	-.3761	0.036	.4527	0.319
parents' residence	.1926	0.075	-.1226	0.633	.0982	0.897

Table 3.11, continued

moved	.1189	0.216	-.2142	0.382	.0632	0.901
father high school			-.1027	0.636	-.0662	0.943
father college	-.1393	0.428	.0934	0.466	.1311	0.863
father MA	.0382	0.765	.0144	0.928	-.3887	0.627
father Ph.D.	-.4841	0.172	.2638	0.592	-.4762	0.563
mother high school	-.1898	0.172	-.2831	0.162	.0783	0.857
mother college	.0279	0.802	-.0244	0.861	-.0063	0.991
mother MA	.2669	0.323	.3146	0.365	1.0906	0.215
mother Ph.D.	.2023	0.276	.2338	0.345	.8844	0.075
constant	9.5925	0.055	10.5644	0.274	12.4322	0.615
N	207		145		62	
R ²	0.4379		0.4770		0.7103	
Ramsey RESET test	0.6432		0.7448		0.7162	

Notes: Dependent variable is the log of real earnings. Regressions were run with robust standard deviation.

Table 3.12. Specific types of study abroad as determinants of income, Classes of 1976 and 1986

	Whole sample		Three largest cities		Rest of Mexico	
	coefficient	p-value	coefficient	p-value	coefficient	p-value
SAbasic	.1902	0.776	-.1068	0.937	--	
SAhighschool	-.7574	0.538	-2.4713	0.368	-3.0057	0.327
Sacollege	-.8063	0.374	-1.0915	0.500	--	
SAgrad	2.5509	0.019	1.4150	0.145	4.3733	0.477
SAother	.2301	0.693	1.0906	0.154	.5663	0.725
Work abroad	.8096	0.247	-.7752	0.587	-.3779	0.887
SAbasic × experience	-.0761	0.398	.0370	0.736	-.0644	0.669
SAhighschool × experience	.0406	0.584	.2633	0.198	.1702	0.486
Sacollege × experience	-.0269	0.656	.0864	0.608	-.1403	0.405
SAgrad × experience	-.1598	0.007	-.0962	0.105	-.2386	0.305
SAother × experience	-.0168	0.609	-.0587	0.211	-.0509	0.529
Work abroad × experience	-.0563	0.224	.0216	0.777	.0689	0.762
SAbasic × GPA70	-.2683	0.804	--		-.8974	0.726
SAbasic × GPA90	2.6129	0.044	--		--	
SAhighschool × GPA70	-.0200	0.970	-2.1142	0.017	-1.1799	0.342
SAhighschool × GPA90	1.3453	0.166	.4224	0.676	2.1164	0.480
Sacollege × GPA70	--		--		--	
Sacollege × GPA90	--		--		--	
SAgrad × GPA70	-.6390	0.259	-.9822	0.101	--	
SAgrad × GPA90	.5535	0.324	.6815	0.298	.2641	0.926
SAother × GPA70	.1728	0.717	-.3729	0.415	1.3893	0.390
SAother × GPA90	.0621	0.878	-.1397	0.792	-.0698	0.973
Work abroad × GPA70	.8191	0.132	1.7188	0.162	-.5163	0.674
Work abroad × GPA90	-.0431	0.928	-.0494	0.953	--	
English	.1506	0.173	.4438	0.010	-.1101	0.836
French	-.0854	0.684	.1316	0.754	-.4974	0.587
female	-.4472	0.063	-.2206	0.537	-.3153	0.588
age	.2138	0.463	.7194	0.053	-.4881	0.824
age ²	-.0024	0.487	-.0075	0.074	.0044	0.879
class of 1976	-.1257	0.850	-1.3674	0.111	4.9741	0.188

Table 3.12, continued

experience	.8407	0.001	.5839	0.299	.6417	0.480
experience ²	-.0229	0.003	-.0139	0.376	-.0266	0.373
ECAcult	.0961	0.671	.0648	0.856	-.2718	0.647
ECAphys	.0151	0.928	.3683	0.103	-.1239	0.884
ECApol	.3898	0.013	.0512	0.808	.6921	0.205
Business major	.2202	0.398	.4487	0.164	.5180	0.594
Engineering major	.0659	0.759	.3034	0.287	.4431	0.695
MA	.2298	0.204	.1420	0.513	-.0054	0.993
Ph.D.	-.3483	0.529	-.2600	0.820	-1.8233	0.626
GPA70	.0497	0.868	.3680	0.278	-.4829	0.608
GPA90	-.1427	0.697	.0772	0.841	-.7926	0.608
public elementary	.0420	0.848	-.2377	0.515	.0514	0.964
public secondary	.2480	0.214	.1476	0.605	.5015	0.586
public high school	-.2959	0.063	.2642	0.241	-.3334	0.804
hours	.0342	0.200	.0711	0.070	.0020	0.959
single	-.5376	0.030	-.7140	0.019	-.8441	0.364
parents' residence	.3642	0.042	-.1305	0.658	-.5346	0.634
moved	.0431	0.791	-.3240	0.222	.3214	0.609
father high school	.6165	0.047	.8706	0.049	-.0521	0.978
father college	.1365	0.440	.0474	0.830	.2521	0.673
father MA	.0548	0.848	.5858	0.109	.2605	0.845
father Ph.D.	.0409	0.944	.0823	0.862	-1.3751	0.459
mother high school	.2219	0.375	-.2973	0.443	.8488	0.433
mother college	-.4748	0.288	-.0006	0.999	-1.0891	0.415
mother MA	-.1821	0.705	.5019	0.466	-.4075	0.822
mother Ph.D.	--	--	--	--	--	--
constant	-10.5979	0.108	-22.6889	0.016	10.4894	0.807
N	160		101		59	
R ²	0.5090		0.7068		0.8423	
Ramsey RESET test	0.8316		0.4806		0.4301	
hettest						

Notes: Dependent variable is the log of real earnings. Regressions were run with robust standard deviation.

Ability seems to complement early study abroad: the coefficient on the term $\text{GPA70} \times \text{SAbasic}$ is negative everywhere and significant for 1996 graduates while that on $\text{GPA90} \times \text{SAbasic}$ is positive everywhere and significant in the pooled regression for the Classes of 1976 and 1986, indicating that the payoff to earlier study abroad is lower for graduates with lower grades and higher for those with higher grades.

These coefficients must be interpreted cautiously, however, because cause and effect are not clear. One possible inference is that the ablest students retain more of the skills earned early in life; another is that, due to innate qualities, they succeed both in the

early abroad experience and in college. Alternatively, poor college grades and lower earnings derived from early study abroad may both be the result of traumatic childhood events involving the time abroad, itself. That is, some students may have responded poorly to being thrust into a new environment and forced to learn a foreign language rapidly; that experience may have influenced the way they responded to education in general thereafter and resulted in low college grades and lower earnings in the long run. Given that the coefficients on the simple GPA dummies are insignificant, however, the significant coefficients on the interacted terms are interesting.

High school study abroad has no significant direct impact on earnings for any group, nor does it seem to influence productivity. However, the same pattern of ability and study abroad observed for early study abroad is present in high school study abroad for long-term earnings (Table 3.12): the coefficient on **SAhighschool** \times **GPA70** is always negative, and significant for city residents, while that on **SAhighschool** \times **GPA90** is always positive. Thus, city-dwellers with college grades far below average derive much less from having gone abroad in high school than do average students, but high-GPA students do not seem to benefit much more from high school study abroad than do their average classmates.

For recent graduates, study abroad in college has a positive, significant impact on income in the pooled sample (Table 3.11), but this is countered by negative coefficients on the interacted term **Sacollege** \times **experience**. Study abroad during college evidently contributes to higher wages initially, but the economic benefits diminish over time. Another possible interpretation is that study abroad serves as a substitute for experience. At the same time, the interaction of ability and college study abroad has the opposite

effect of that observed at earlier levels: now, those with poor grades benefit *more* from study abroad, while students with high grades benefit less. In the long term (Table 3.12), none of these effects are significant.

It is impossible to measure the value of graduate study abroad for recent college graduates, as they have generally not had time to complete a foreign graduate program and begin work in Mexico. Earlier graduates (Table 3.12), however, benefit more from graduate study abroad than from any other type of study abroad. This effect does diminish with time, as indicated by the negative coefficients on the variable interacted with experience, but sixteen years are required to close the gap (assuming a linear relationship). If this is accurate, then the skills acquired in foreign graduate schools either become obsolete or are forgotten, and do not contribute to higher productivity growth.⁵¹ If students know this, then it is indicative of a fairly high rate of time-preference (δ).

The terms interacted with grades have the expected signs, but are insignificant. Overall, there is only weak evidence that alumni with higher college grades benefit more from graduate study abroad than do those with lower college grades.⁵² Possibly, those with higher college grades stay abroad after completing a foreign degree or return to

⁵¹ Alternatively, this result may arise from a limitation of the data: older individuals are more likely to have higher degrees and, thus, to have pursued graduate studies abroad; they also have more experience and their earnings increases have not kept pace with starting wages. I have tried to control for this inconvenience in the regressions.

⁵² The same regression with SAgrad2 (replacing SAgrad) defined as “studied abroad during graduate studies and completed at least the master’s degree” gave similar results. In the “Rest of Mexico” regression, the variable interacted with GPA70 was dropped, indicating that non-city residents who participated in study abroad at this level did not complete the degree. This failure to follow through is reflected in the negative coefficient on this interacted variable in Table 3.6. For the three largest cities, a clear complementarity of study abroad and grades emerges through a significantly positive coefficient on the interacted term **SAgrad2 × GPA90**.

Mexico under the employment conditions of a scholarship (see section 3.3.1, above), limiting their income potential for a time.

“Other” foreign courses are more important for recent graduates than for earlier classes. The interacted terms are insignificant.

Work abroad has no significant impact on long-term earnings (Table 3.12), but for recent graduates (Table 3.11) with high grades, work abroad is associated with lower income. In fact, the negative sign on this coefficient holds throughout the regressions, but is insignificant in all except the pooled regression of Table 3.11. For high-ability students, therefore, working abroad has a detrimental effect on earnings. The foreign employment may be unrelated to the student’s major, or may somehow interrupt his supply of information about the labor market.

In order to measure the overall impact of specific types of study abroad, I ran these same regressions without the interacted terms. The results are presented in Table 3.13. (Coefficients on the controls are excluded from the table.) For recent graduates, early study abroad, “other” courses, and work abroad are associated with higher earnings, while graduate study abroad has a significant, negative coefficient. Since any recent graduate who has completed graduate school abroad has had little time to find employment,⁵³ the negative coefficient is probably due to those who dropped out of foreign graduate programs. The “other” programs include firm-specific training, which labor theory tells us should contribute to higher earnings.

⁵³ Some European schools offer one-year master’s degree programs; in this case, students would have returned approximately one year before the survey, assuming that entrance into the program began immediately after college graduation.

Long-term earnings (Classes of 1976 and 1986) are not influenced by any specific type of study abroad, according to the pooled regression, but in individual markets the value of each is revealed. In the cities, high school study abroad contributes to higher earnings, while work abroad has the opposite effect. In the rest of Mexico, however, having worked abroad is a significant contributing factor for higher income.

Table 3.13. Earnings regressions without interacted terms

Class of 1996						
	Whole sample		Three largest cities		Rest of Mexico	
	coefficient	p-value	coefficient	p-value	coefficient	p-value
SAbasic	.4194	0.022	.1212	0.599	.5404	0.162
SAhighschool	-.0864	0.485	-.0863	0.531	.1957	0.606
SACollege	.1647	0.279	.1219	0.640	.2552	0.407
SAgrad	-1.2634	0.000	--		-1.3065	0.193
SAother	.1123	0.181	.1848	0.087	-.0988	0.766
Work abroad	.4070	0.011	.3739	0.018	.0702	0.899
English	.0727	0.356	.1012	0.219	.0338	0.922
French	.0763	0.191	.0998	0.161	-.1026	0.704
N	207		145		62	
R ²	0.3793		0.4362		0.5718	
Ramsey RESET test	0.5911		0.7451		0.4053	

Classes of 1976 and 1986						
	Whole sample		Three largest cities		Rest of Mexico	
	coefficient	p-value	coefficient	p-value	coefficient	p-value
SAbasic	-.3600	0.429	.4052	0.181	-.7658	0.223
SAhighschool	.0216	0.939	.7084	0.055	-.8330	0.195
SACollege	-.4683	0.434	-.0854	0.762	-1.7281	0.145
SAgrad	-.1541	0.650	-.1405	0.661	-.4526	0.528
SAother	.0817	0.609	.0860	0.648	.2502	0.353
Work abroad	-.1457	0.429	-.4358	0.040	1.0790	0.041
English	.0695	0.502	.3245	0.019	-.1768	0.543
French	-.0982	0.605	-.0268	0.932	-1.1500	0.017
N	160		101		59	
R ²	0.3989		0.6244		0.7335	
Ramsey RESET test	0.8708		0.5155		0.5637	

Notes: All regressions run with robust standard deviation. Controls included are the same as those in Tables 3.7-3.12.

3.4.3 Other effects of study abroad

While it is clear that study abroad at certain levels has a direct impact on income, there are several other ways in which study abroad may influence income indirectly. In

this section, I examine some of these avenues. Tables 3.14, 3.15, and 3.16 present the results of a series of logit regressions in which the study abroad variables are considered independent and the dependent outcomes are, in turn, attending graduate school (two measures, and by graduating class), unemployment, and mobility.

3.4.3.1 Pursuing graduate studies

The pursuit of higher degrees is an important outcome because it influences future earnings of the individual and, on a macroeconomic scale, national growth. Table 3.14 presents the results of regressions on the whole sample, first limiting the dependent variable to completion of the master's degree and then including current enrollment in the dependent variable. Table 3.15 breaks the sample into two sub-samples: the most recent graduates (Class of 1996) and previous graduates (Classes of 1976 and 1986), including both those with degrees completed and those enrolled in graduate programs at the time the survey was conducted.

The first regression in Table 3.14 measures the marginal effects of study abroad and other variables on the probability of completing a master's degree. Early study abroad has a significant positive impact on the probability of completing the master's degree. College study abroad has a significant negative impact on master's degree completion; this negative impact is mostly, but not entirely, eliminated for the best students (as evidenced by the large significant coefficient on **SACollege** × **GPA90**). Good students who have worked abroad or taken "other" courses abroad are less likely to have completed a master's degree. Language skills contribute to a higher probability of completion, possibly because both are at least partially related to a love of learning.

Table 3.14. Determinants of attending graduate school

	Completed master's degree		Completed master's degree or currently enrolled in graduate program	
SAbasic	2.3322	0.015	1.0489	0.102
SAhighschool	.7487	0.454	-.6719	0.293
Sacollege	-18.7472	0.000	-.7552	0.273
SAother	-.9910	0.138	-.2472	0.501
Work abroad	.5487	0.550	-.0472	0.349
SAbasic × experience	-.1528	0.050	-.0724	0.349
SAhighschool × experience	-.1365	0.062	-.0136	0.799
Sacollege × experience	.2698	0.085	.1653	0.052
SAother × experience	.0207	0.608	-.0019	0.944
Work abroad × experience	-.0416	0.495	-.0299	0.575
SAbasic × GPA70	1.3327	0.255	1.3627	0.224
SAbasic × GPA90	-2.1562	0.337	-.7316	0.573
SAhighschool × GPA70	1.3945	0.186	.6898	0.448
SAhighschool × GPA90	1.1609	0.375	.9861	0.323
Sacollege × GPA70	19.6545	.	.2803	0.845
Sacollege × GPA90	17.4070	0.000	-.4066	0.674
SAother × GPA70	.4722	0.639	.0396	0.686
SAother × GPA90	-3.5363	0.002	-.4459	0.392
Work abroad × GPA70	-1.5569	0.224	.0396	0.974
Work abroad × GPA90	-3.5363	0.002	-1.8555	0.028
English	.5115	0.049	.6047	0.003
French	1.2881	0.000	.7249	0.000
Female	-.6160	0.138	-.0936	0.690
Class of 1976	5.6093	0.001	1.2608	0.437
Class of 1986	3.9683	0.000	.4019	0.609
experience	-.0507	0.539	.0421	0.603
Scholarship	.6905	0.045	.6139	0.007
GPA70	-.4877	0.457	-.1032	0.786
GPA90	.2983	0.518	.5948	0.074
Business	-.0265	0.954	.3266	0.253
Engineering	.3139	0.435	.3967	0.130
Moved before college	-.2396	0.494	.1017	0.673
resparents	-.4091	0.162	-.1790	0.382
public elementary	-.9055	0.051	-.7009	0.033
public secondary	.6167	0.153	.1807	0.586
public high school	-.6929	0.023	-.3553	0.102
father high school	.4625	0.351	.3761	0.322
father college	.2154	0.527	.1239	0.620
father MA	.2643	0.565	.6934	0.038
father Ph.D.	.7327	0.331	.7243	0.190
mother high school	-.3860	0.375	-.2636	0.376
mother college	-.1266	0.793	.0642	0.808
mother MA	-1.1556	0.224	-1.0387	0.125
mother Ph.D.	1.5044	0.171	1.7205	0.071
Constant	-4.7497	0.000	-3.0183	0.000
N	622		622	
Likelihood	-175.2394		-338.85305	
Pseudo R2	0.3993		0.1550	

Notes: Regressions were run with robust variance. p.f.p. = predicts failure perfectly

There is some truncation in the dependent variable, because it is possible that some graduates, especially of the Class of 1996, might have completed the degree after the survey was taken. For this reason, the second regression in Table 3.14 includes those currently enrolled in a graduate program. There is less truncation here, but another possible source of error is introduced in the assumption that those now enrolled will complete the degree. The main result of redefining the dependent variable in this way is to reduce the size or significance of the coefficients relative to the first regression. Three variables become significant in the new regression: GPA90, father MA and mother Ph.D. All three have a positive impact on the probability of attending graduate school. English gains in importance, while French loses some.

In order to control somewhat for the fact that the most recent graduates had only two years before the survey in which to begin graduate school, while many Mexicans return to school much later, I have broken the sample into two sub-samples: Class of 1996 and Classes of 1976 and 1986. The results of regressions on these sub-samples, using the broader definition of graduate school attendance, are presented in Table 3.15. For the Class of 1996, study abroad at any time before college has a significant positive effect on graduate school enrollment, which is extenuated by experience. At the same time, none of the best students who also studied abroad in elementary or secondary school had enrolled in a master's degree program within two years of graduation. We must remember, however, that self-selection may be interfering with correct analysis: many of those who had enrolled might have been abroad, studying, at the time of the survey, and thus were not included. French fluency increases the probability of pursuing graduate studies.

Table 3.15. Determinants of attending graduate school*

	Class of 1996		Classes of 1976 and 1986	
	Coefficient	p-value	Coefficient	p-value
SAbasic	6.9751	0.012	67.7862	0.000
SAhighschool	20.7870	0.005	-.8940	0.741
SACollege	-7.8988	.	-123.6912	0.000
SAother	5.6105	0.158	-1.1936	0.315
Work abroad	63.8372	.	.5105	0.829
SAbasic × experience	-1.9620	0.092	-5.0882	0.000
SAhighschool × experience	-7.2469	0.013	-.0953	0.555
SACollege × experience	-5.9745	0.036	8.2035	0.000
SAother × experience	-2.8981	0.135	.0301	0.646
Work abroad × experience	-29.5352	0.000	-.0672	0.609
SAbasic × GPA70	6.57e+07	.	30.2417	0.000
SAbasic × GPA90	p.f.p.		2.0049	.
SAhighschool × GPA70	-3.4349	0.159	3.3082	0.074
SAhighschool × GPA90	2.1292	0.442	4.2204	0.055
SACollege × GPA70	6.57e+07	.	p.f.p.	
SACollege × GPA90	20.8929	0.000	coll.	
SAother × GPA70	-6.57e+07	.	2.2040	0.098
SAother × GPA90	4.6097	0.128	-.0897	0.936
Work abroad × GPA70	p.f.p.		-16.1028	0.000
Work abroad × GPA90	p.f.p.		-13.0671	0.016
English	.9198	0.348	.4953	0.103
French	1.6435	0.016	6.6096	0.010
Female	-.7658	0.453	.3762	0.465
experience	4.1650	0.019	.1237	0.283
Scholarship	1.0942	0.109	.5721	0.207
GPA70	.6136	0.536	-1.3644	0.108
GPA90	-1.3541	0.265	-.0274	0.962
Business	.2704	0.829	-.3124	0.638
Engineering	.7212	0.544	.7297	0.258
Moved before college	.3578	0.677	-.0657	0.877
resparents	-1.8808	0.139	.0980	0.807
public elementary	1.5860	0.267	-1.7454	0.011
public secondary	.8778	0.512	.5460	0.354
public high school	-.9120	0.383	-.6717	0.080
father high school	p.f.p.		1.2755	0.056
father college	3.3187	0.000	-.1724	0.711
father MA	1.8919	0.159	.9013	0.218
father Ph.D.	1.4660	0.356	2.3606	0.017
mother high school	-1.9644	0.096	-.6081	0.347
mother college	-.4303	0.634	-.1275	0.851
mother MA	p.f.p.		-2.0873	0.073
mother Ph.D.	-.2197	0.861	coll.	
Constant	-22.1310	0.000	-2.4644	0.383
N	358		217	
Likelihood	-37.4955		-103.6198	
Pseudo R2	0.4746		0.3093	

Notes: Regressions were run with robust variance to account for heteroskedasticity. p.f.p. = predicts failure perfectly; coll. = dropped due to collinearity. * Dependent variable equals one if the individual has completed a master's degree or is currently enrolled in a graduate program, zero otherwise.

For the earlier classes, the results are more revealing. These graduates had twelve or twenty-two years to pursue higher degrees before this survey. For this group, early study abroad has a significant and positive impact on attending graduate school, especially for students with low college grades. At the same time, participation in study abroad during college is associated with a much lower probability of graduate school enrollment. Although the interaction of experience and college study abroad has a positive influence, it is insufficient to overcome the direct effect. French language ability has a stronger impact on graduate school attendance for this group than for more recent graduates, while English proficiency has none.

3.4.3.2 Unemployment

Table 3.16 estimates the impact of study abroad on unemployment and mobility. Current unemployment is the dependent variable in the first regression. The dependent variable in the second regression is “unemployed ever”, a dummy constructed to equal one if the respondent answered yes to the question “Have you ever been unemployed for more than six months?” or indicated “unemployed” in response to the question “What do you do now?” Experience variables are omitted from both of these regressions because experience is calculated using information on unemployment.

Of the study abroad variables, only early study abroad has a significant impact on unemployment: those who studied abroad before high school are less likely to have been unemployed at the time of the survey or ever since college. Although the signs on the remaining study abroad variables are positive, none is significant. This suggests that time spent abroad in the most formative years has a lasting influence on the employee, but later foreign study does not necessarily make him less susceptible to unemployment.

Another possible interpretation is that families who go abroad when their children are small impart values to their children that serve them better in the work force than the values held by families who remain in Mexico.

Table 3.16. Study abroad as determinant of unemployment and mobility

	Unemployed now		Unemployed ever		Moved since college	
	Coefficient	p-value	Coefficient	p-value	Coefficient	p-value
SAbasic	-16.6389	0.000	-17.0722	0.000	.7578	0.246
SAhighschool	.1500	0.846	.6490	0.333	-.3895	0.599
Sacollege	.9070	0.197	.3123	0.702	-.7664	0.236
SAGrad	1.0588	0.436	.7854	0.506	-2.8315	0.023
SAother	.5619	0.177	.5094	0.173	.1419	0.705
Work abroad	.0003	1.000	.2413	0.746	-.6264	0.438
SAbasic × experience					-.0271	0.672
SAhighschool × experience					.0028	0.955
Sacollege × experience					-.0705	0.427
SAGrad × experience					.1479	0.048
SAother × experience					.0203	0.545
Work abroad × experience					-.0019	0.972
SAbasic × GPA70	15.9266	.	16.6385	.	-.7060	0.568
SAbasic × GPA90	p.f.p.		p.f.p.		-.6535	0.585
SAhighschool × GPA70	1.7916	0.150	.6179	0.592	1.2946	0.139
SAhighschool × GPA90	1.0246	0.404	-.0469	0.967	.6445	0.485
Sacollege × GPA70	p.f.p.		p.f.p.		p.f.p.	
Sacollege × GPA90	-1.4169	0.271	-.9948	0.478	1.2342	0.293
SAGrad × GPA70	-.2065	0.904	.0564	0.972	.5096	0.738
SAGrad × GPA90	p.f.p.		p.f.p.		-.1228	0.929
SAother × GPA70	-.3854	0.715	-1.0124	0.259	-.1618	0.802
SAother × GPA90	-.0210	0.982	-.0109	0.988	.1442	0.806
Work abroad × GPA70	-.1502	0.945	-.4835	0.792	.4224	0.686
Work abroad × GPA90	p.f.p.		.4754	0.735	-.3527	0.742
English	-.0435	0.871	.0639	0.775	-.0572	0.772
French	-.2013	0.588	-.0067	0.982	.1899	0.391
Female	.6693	0.086	.6830	0.037	-.2386	0.375
Class of 1976	-.2880	0.686	-.4113	0.512	2.1090	0.335
Class of 1986	-.4409	0.397	.1263	0.752	1.1978	0.280
experience					-.1451	0.202
Scholarship	.9215	0.022	.5034	0.133	.6092	0.015
GPA70	.4602	0.464	.8481	0.087	-.7404	0.078
GPA90	-.3891	0.524	-.3769	0.446	.0817	0.841
Business	.2602	0.590	.3418	0.425	-.1153	0.708
Engineering	.4254	0.333	.3121	0.420	.0647	0.815
MA	-.0963	0.867	-.3391	0.472	.7842	0.037
Ph.D.	p.f.p.		p.f.p.		.0593	0.963
Moved before college	-.5387	0.227	-.5395	0.146	1.1013	0.000
Moved after college	-.7588	0.082	-.4213	0.280		
Born in city	-.1145	0.764	-.0073	0.985	-.1651	0.559
resparents	-.5565	0.180	-.1037	0.789	-2.2579	0.000
public elementary	-1.3589	0.011	-1.0433	0.018	-.6423	0.059

Table 3.16, continued

public secondary	1.2136	0.015	.9149	0.021	.0636	0.860
public high school	-1.1398	0.001	-.7089	0.014	-.1509	0.563
father high school	-1.7775	0.099	-1.1145	0.156	.4792	0.283
father college	-.3656	0.406	-.2518	0.500	-.1139	0.680
father MA	-.2800	0.625	-.6025	0.252	.1500	0.671
father Ph.D.	p.f.p.		p.f.p.		.0884	0.914
mother high school	.1230	0.824	.3702	0.403	.0590	0.860
mother college	.3182	0.438	.2172	0.554	-.0453	0.876
mother MA	-.0553	0.960	-.1687	0.878	-.9536	0.253
mother Ph.D.	p.f.p.		p.f.p.		-1.1475	0.269
Constant	-1.7516	0.075	-2.1773	0.011	.7032	0.351
N	567		574		611	
Likelihood	-140.7316		-184.2461		-289.3734	
Pseudo R ²	0.1315		0.0913		0.2422	

Notes: Regressions were run with robust variance. p.f.p. = predicts failure perfectly.

The interacted terms reveal very little, except that many of the best students have not suffered unemployment, as demonstrated by the fact that several terms interacted with GPA90 predict failure perfectly. Languages have no impact on unemployment. Grade point average, on the other hand, is inversely related with the probability of suffering unemployment. Mobility is also associated with a lower probability of unemployment.

3.4.3.3 Mobility

The final regression in Table 3.16 concerns post-college mobility. The dependent variable equals one if the graduate's place of residence at the time of the survey differs from his parents' residence during the college years. By Proposition 3.5, we expect those who study abroad, especially at the graduate level, to be more mobile as they search for better wages. There is, however, only faint evidence to support Proposition 3.5. The direct impact of graduate study abroad is negative, while this term interacted with experience has a positive, significant coefficient. The coefficients on the rest of the study abroad terms are insignificant and follow no particular pattern. Thus, Proposition 3.5 is

not supported. In keeping with labor theory, however, more able graduates and those with master's degrees are more mobile.

3.5 Conclusions

In general, Proposition 3.1 (study abroad increases starting earnings) holds but Proposition 3.2 (study abroad increases earnings growth) does not. That is, starting wages tend to be higher for those who have studied abroad than for those who have not, but foreign human capital does not contribute to higher earnings growth. In more detail, one or the other holds, but not both. On average, those who had studied abroad in this sample earned \$9,000 pesos (36%) more per month than did those who had studied exclusively in Mexico. On the margin, study abroad increases recent graduates' earnings by more than earlier graduates' earnings. This is especially true at the graduate level.

Proposition 3.3 (returns to study abroad are place-specific) is upheld: the payoff for study abroad, and for language skills, differs widely between the cities and the rest of Mexico. Most strikingly, English and French fluency are highly remunerated in the three largest cities, but not in the rest of Mexico. The returns to specific types of study abroad also differ between the cities and the rest of Mexico, confirming the importance of markets in determining the returns to foreign human capital.

Proposition 3.4 (undergraduate separation from family and graduate study abroad) is not supported. Nor is family mobility linked to the decision to study abroad in graduate school.

There is no strong support of Proposition 3.5 (study abroad and internal migration). On the contrary, study abroad in graduate school has a negative impact on post-graduate mobility. Although the interaction between graduate study abroad and

experience has a significant positive impact on post-college mobility, this effect is small relative to the direct effect. Evidently, the propensity to move in search of better employment opportunities is not strongly influenced by study abroad, when other factors are taken into account.

Proposition 3.6 (ability and earnings incentives to study abroad) is supported. More able students benefit more from study abroad, in general. Specifically, students with higher college GPA benefit more from study abroad at the basic, high school, and graduate levels, but not from college foreign exchange programs nor from short-term courses in language or other training abroad. This finding justifies the practice of many scholarship foundations, which make awards to only the applicants with the best scholastic credentials. It is also good news for corporations sending employees abroad for training: the employee need not be academically inclined in order to benefit fully from such investment.

Proposition 3.7 (family wealth and study abroad) is somewhat confirmed by the results. Scholarship recipients are less likely to study abroad at any level. Since many of these “scholarships” are actually loans, this variable is an indicator of wealth. The educational attainment of fathers is generally related positively to study abroad; however, the opposite is true of the educational attainment of mothers. To the extent that parental education is a proxy for wealth, the results are mixed.

In summary, study abroad is associated with higher earnings for Mexicans. A direct economic benefit is derived from the mastery of foreign languages, at least in the large cities, but evidently other skills or knowledge acquired abroad are also valuable in the Mexican labor market. The fact that the differential diminishes over time suggests a

commodity whose value depends on its being current. This might include the most modern techniques (which are later supplanted by other technology), or cultural skills or networks that lose their relevancy, or even an expected higher productivity level which ultimately proves to be wanting. Alternatively, the skills acquired abroad may be important in entry-level positions, but less so as one climbs the administrative ranks.

Policy Implications

The results of this study are important, especially for Mexico but also for other less-developed countries. For the first time, there is proof of the value of study abroad. Educational finance programs such as CONACyT are justified in providing scholarships for study abroad, especially to the ablest students, as these returning students clearly contribute more to national product after study abroad than they would if they had studied in Mexico.⁵⁴ Furthermore, the effect of English proficiency on income suggests that early language education would have enormous payoffs, for Mexico if not for individuals, in the long run. Although an increase in the supply of these skills may eventually eliminate the wage differential, it is also likely to attract investment, resulting in more jobs.

Extensions

This study could be extended in several ways. A more complete database would allow for richer examination of other variables, which was limited by the relatively small sample size. For example, CONACyT has begun surveying its former scholarship recipients; this database, if available, would enable the study of a more varied sample of

⁵⁴ Glaser (1978) discusses the desirability of using such studies for this purpose.

Mexican college graduates. While several excellent labor market surveys exist, future income surveys should include questions regarding the place of study at various levels.

In addition, it would be very interesting to compare the Mexican experience to that of other countries, especially in light of the market-specific effects observed in this small sample. Is study abroad profitable elsewhere?

Finally, a new question arises that has been only partially answered here: why does foreign human capital have a positive impact on wages for natives, when other studies find that it has a negative influence on earnings for immigrants?

Chapter 4

Personality and Income among White-Collar Workers in Mexico

4.1 Introduction

Personality has been largely ignored by empirical economists. It is more common to find earnings in psychological studies than psychological factors in economic models. Yet there is increasing interest in this issue within both disciplines. A recent thorough investigation of the state of research concerning non-cognitive traits and earnings (Bowles *et al.*, 2001b) concludes that (1) non-cognitive traits are important determinants of earnings and (2) more research is necessary.

In this study, I use matched employee-supervisor surveys to identify the personality characteristics that Mexican employers value most. The measures of personality in previous research on traits and earnings typically come from self-evaluations or professional assessments (O'Reilly and Chatman, 1994, compares the two), although occasionally peer-assessments are included. (See McCrae and John, 1992, for a good survey of the literature.) When supervisors are surveyed, they are questioned about the employee's performance, not his personality (Barrick and Mount, 1994).

The underlying assumption in studies relying on self-assessments is that employers observe, value, and reward the same characteristics that employees report. Bowles *et al.* (2001b: 1170) suggest that "because we are interested in situationally specific behaviors (rather than some intrinsic underlying characteristics of the individual) there is much to recommend the little-used peer rating method, which elicits perceptions of the individual's behavior from work- or school-mates...." Yet peers are not in the

same situation as a supervisor, who influences pay and promotions. This paper attempts to estimate the value to Mexican employers of personality traits, by comparing self-assessments directly with supervisor's evaluations and the importance of each for compensation. To the best of my knowledge, no other study has done this with any dataset, for any country. There are important differences between both the trait levels reported and the resulting coefficients in standard earnings regression analysis. This data presents evidence that self-assessments of traits may be biased upward due to non-reporting by employees who should rate themselves poorly.

This study is also valuable because, as far as I have been able to determine, it is the first exploration of non-cognitive traits and earnings in Mexico. I find that motivational traits such as hard-working and are not valued by employers in my sample, as they seem to be in previous personality research, whereas factors related to openness are associated with higher compensation. Overall, personality has very little influence on within-occupation earnings, but responsibility is associated with promotion. There is some evidence that "male" traits may be more highly rewarded for men than for women.

I begin by describing the data in Section 4.2; Section 4.3 presents the model; Section 4.4 highlights differences between self-assessed personality and supervisor assessments, and the importance of each for earnings; Section 4.5 analyzes the impact of each personality trait on compensation and promotions, overall and by gender; and conclusions are in Section 4.6.

4.2 Data

The data are from surveys applied by a Mexican university to its local alumni and their supervisors. In principle, the classes of 1970, 1980, and 1990 were included, but the

sample was expanded to years surrounding those dates. Of 1,081 student surveys, only 328 had matching supervisor surveys. After merging the alumni and supervisor data and eliminating observations missing gender, income (as reported by either the employee or the supervisor), or GPA, and one observation missing all the supervisor responses to the personality questions, 314 observations remain: 198 men and 116 women. Observations with some, but not all, personality responses missing were kept.

It is important to note that this sample, by definition, is limited to those with at least a college education, in a country where nearly 90% of the population has less than this. Also, since the alumni provided the information to allow for supervisors to be contacted, there may be some self-selection: employees who had poor relations with their bosses may have omitted the contact information, resulting in upward-biased employer assessments and possibly more significant estimated coefficients than would be obtained from a truly random sample.

The question of interest was posed to both the employee and the supervisor:

Indicate how well each statement describes yourself/the employee. This person:

- | | |
|-----------------------------|--------------------------------|
| a. is open-minded. | g. is flexible. |
| b. has high work standards. | h. is responsible. |
| c. is creative. | i. works well in teams. |
| d. works hard. | j. is loyal. |
| e. is visionary. | k. seeks economic advancement. |
| f. takes risks. | |

The responses were coded from 1 (very well) to 5 (very poorly). Due to the nature of the coding, the signs on corresponding coefficients require inverse interpretation.

The personality literature of recent decades has classified personality traits into five categories: Motivation (also called Conscientiousness), Extraversion, Agreeableness, Neuroticism, and Openness to Experience (also called Intellectance or Culture).⁵⁵ Four of the traits in this survey—High Work Standards, Hard Working, Responsibility, and Advancement-Seeking—fall clearly under Motivation. This factor has been identified by psychologists as the most important personality factor in long-term earnings (Barrick and Mount, 1991; Bowles *et al.*, 2001b; Harrell, 1969; Jones and Whitmore, 1995; Judge *et al.* 1995; Judge *et al.*, 1999)⁵⁶; in most economic studies it is the only psychological factor included (Duncan and Dunifon, 1998; Kiker and Condon, 1981; Long, 1995).⁵⁷ Those with high Motivation may enjoy more flexible work hours (Duncan, 1976) or higher earnings. Ability may enhance the effect of Motivation on earnings (O'Reilly and Chatman, 1994).

Bowles *et al.* (2001a, 2001b) use the term “incentive-enhancing preference” in describing these traits. If an employee has High Work Standards, for example, the costs of supervision are lower because the employee is conscientious. A Hard Worker will stay overtime and work weekends to meet deadlines; Bowles *et al.* (2001a) argue that hard workers earn more than do slackers. A Responsible employee, by definition, also does not slack. There is some evidence that Advancement-seeking or “Machiavellianism”

⁵⁵ The interested reader is referred to Barrick and Mount (1991), Costa and McCrae (1992), Eysenck (1992), Judge *et al.* (1999), McAdams (1992), and McCrae and John (1992) for arguments in the debate over this classification.

⁵⁶ An exception is Harrell and Alpert (1989), which finds social extraversion the only important factor.

⁵⁷ Exceptions are Filer (1983), which looks at preferences for job characteristics, and Kalachek and Raines (1976), which considers “self-confidence”, the opposite of neuroticism.

(Bowles *et al.*, 2001b) and other “male” traits or behavior (Daymont and Andrisani, 1984) are rewarded in the labor market.

Four of the traits—Open-Mindedness, Creativity, Vision, and Flexibility—are related to Openness to Experience. Previous studies have found that Openness may contribute to higher earnings, but is less closely related to earnings than is Motivation (Judge *et al.*, 1999). Barrick and Mount (1991) argue that Openness enables employees to benefit more from training, thus leading to higher salaries in occupations that require on-the-job training. An Open-Minded person is more able to adapt to change and take on new projects, allowing for more rapid adoption of new technologies, techniques, and processes. A Creative person develops new ideas and combines things in new ways, possibly leading to new products or services, or to cost reductions. A Visionary thinks in terms of long-run implications; she tends to work harder in order to avoid termination, and therefore earns more (Bowles *et al.*, 2001a). A Flexible employee readily adjusts to changing conditions and requirements, and is willing to fill in where needed to get the job done.

The three remaining characteristics are more difficult to categorize using the five-factor model. For example, Risk-taking might be considered Openness if it is interpreted as “open to new ideas”, but it could be Neuroticism if it means “impulsive”. While Openness is considered a positive factor, Neuroticism is negative (Kiker and Condon, 1981; Barrick and Mount, 1991; Harrell, 1969; Judge *et al.*, 1999). As this trait is open to interpretation, it is impossible to anticipate its effect on earnings, although Bartlett and Miller (1985) find that taking risks contributes to higher pay among female executives in the United States.

The ability to participate in Teamwork is also ambiguous: it could reflect either Extraversion or Agreeableness. Extraversion generally has a positive influence on earnings, but Agreeableness has the opposite effect (Judge *et al.*, 1999). Barrick and Mount (1991) tie Extraversion, like Openness, to training proficiency, suggesting that the payoff for this ability may be job-specific. The ability to work in teams has received increasing attention (Duncan and Dunifon, 1998) in recent years. Indeed, many new educational techniques focus on teamwork in order to develop this skill. If this is an important “soft skill”, then employees with this trait should earn more.

Loyalty could be classified either Agreeableness or Conscientiousness (although it does not fit well in any of the five categories). As mentioned above, the former has been found to have a negative effect on earnings; the latter, positive. Wise (1975: 353) finds that “a negative relation is observed between an individual’s desire for job security and his job success.” If Loyalty represents a need for job security, it may have a negative effect on earnings. Although Loyalty should be valued, it is also true that a loyal employee will be retained with lower earnings than will one who is fickle.

Descriptive statistics are presented in Table 4.1. Approximately 37% of the sample is female: a high proportion relative to the Mexican college-educated population. Men earn more on average than women earn, but they also have more years of experience and more higher degrees, and are more often engineers or business graduates.

Male employees tend to report higher compensation levels than their supervisors, while women report lower levels. Although women and men rate themselves similarly on personality traits, with no particular pattern of bragging or underestimating characteristics, women are better rated (on average) by supervisors than are men on all

traits except advancement-seeking. Perhaps supervisors are more generous with their female underlings. Possibly, women who self-select into employment either set higher standards for themselves or must meet higher standards than men to compete.

Table 4.1. Descriptive statistics

	Full sample			By gender					
	Mean	s.d.	Obs	Men			Women		
				Mean	s.d.	Obs	Mean	s.d.	Obs
Female	.3694	.4834	314						
Compensation (self)	8.2946	8.3620	314	10.4874	9.3522	198	4.5517	4.2515	116
Compensation (boss)	7.9586	7.9067	314	9.7727	8.7737	198	4.8621	4.7902	116
experience (years)	5.8384	5.8610	314	6.8220	6.4007	198	4.1595	4.3364	116
scholarship	.4204	.4944	314	.3939	.4899	198	.4655	.5010	116
GPA	84.6815	5.4452	314	84.2172	5.3630	198	85.4741	5.5159	116
Business	.3025	.4601	314	.2071	.4062	198	.4655	.5010	116
Engineering	.5764	.4949	314	.6970	.4607	198	.3707	.4851	116
Other	.1210	.3267	314	.0960	.2953	198	.1638	.3717	116
Entrepreneur	.2580	.4382	314	.3182	.4670	198	.1552	.3636	116
Levels	2.6001	1.5788	263	2.6747	1.6226	166	2.4742	1.5006	97
Firm size (self)	3069.5	7203.6	245	3731.9	8014.4	151	2005.4	5540.1	94
Firm size (boss)	2334.2	5486.6	281	3023.4	6560.5	179	1124.9	2297.9	102
Time to first job (yrs)	.1011	.2526	314	.0518	.1838	198	.1853	.3232	116
Master's degree	.3439	.4758	314	.4091	.4929	198	.2328	.4244	116
Doctorate	.0191	.1371	314	.0253	.1573	198	.0086	.0928	116
Boss alma mater	.5892	.4928	314	.6162	.4876	198	.5431	.5003	116
Self-assessments									
Open mind	1.8266	.6690	271	1.8023	.6809	172	1.8687	.6491	99
High Standards	1.3566	.5964	272	1.4269	.6679	171	1.2376	.4278	101
Creative	1.9480	.7947	269	1.9527	.8151	169	1.9400	.7630	100
Hard worker	1.4111	.6935	270	1.4882	.7711	170	1.2800	5.1405	100
Visionary	2.0520	.8580	269	2.0118	.8997	169	2.1200	.7821	100
Risk-taker	2.2426	.8844	272	2.2398	.9048	171	2.2475	.8533	101
Flexible	2.1471	.9094	272	2.1930	.9160	171	2.0693	.8973	101
Responsible	1.2787	.6252	271	1.3684	.7186	171	1.1500	.3860	100
Teamwork	1.6912	.8375	272	1.7661	.8563	171	1.5644	.7927	101
Loyal	1.3444	.6365	270	1.4201	.6951	169	1.2178	.5021	101
Advancement-seeker	1.5919	.7913	272	1.5556	.8409	171	1.6535	.6991	101
Supervisor Assessments									
Open Mind	1.7732	.6624	313	1.8182	.6586	198	1.6957	.6676	115
High standards	1.4665	.6791	313	1.4949	.6962	198	1.4174	.6487	115
Creative	1.7853	.7705	312	1.8030	.7651	198	1.7544	.7821	114
Hard worker	1.3814	.6150	312	1.4040	.6279	198	1.3421	.5924	114
Visionary	1.9706	.7726	272	1.9770	.7599	174	1.9592	.7984	98
Risk-taker	2.3187	.8855	273	2.2774	.8717	173	2.3900	.9089	100
Flexible	2.0328	.8402	274	2.0402	.7854	174	2.0200	.9318	100
Responsible	1.2303	.5628	310	1.3503	.6012	197	1.1858	.4734	113
Teamwork	1.5513	.7505	312	1.6616	.7750	198	1.3596	.6669	114
Loyal	1.3866	.7166	313	1.4596	.7580	198	1.2609	.6225	115
Advancement -seeker	1.5956	.7175	272	1.5607	.7096	173	1.6566	.7307	99

4.3 Model

The econometric model is a standard semilog earnings regression.⁵⁸ Following Elliot and Sandy (1998), both measures of personality traits are included in each regression:

$$Y_{i,S,B} = X_i'\beta + P_{iS}'\gamma_S + P_{iB}'\gamma_B + u_i$$

where

S = self (-reported variable)

B = boss (-reported variable)

Y = natural log of compensation (earnings plus benefits)

X = vector of standard income regression covariates (controls)

P = vector of personality traits (self-reported or reported by boss)

u_i = random error term

Including both self-assessed and supervisor-assessed personality traits in the same regression means that the coefficient on each measures its marginal contribution, while controlling for the other. In particular, coefficients on boss-reported personality traits indicate the importance of variation in the supervisor's evaluation for individuals with the same self-assessment.

The controls include female indicator, experience (in years, calculated based on graduation year, time to first job, and graduate degrees) and its square, year of graduation, grade point average (self-reported in five-point ranges), master's degree

⁵⁸ Due to the nature of the compensation variable, interval regression was also tried, but there was no qualitative difference between interval regression and standard OLS, so OLS was chosen for ease of comparison with other studies. All estimation was carried out using *Stata 7.0*.

completed, Ph.D. completed, indicator variables for Business and Engineering majors, an entrepreneur dummy (equal to one for those who indicate having owned or been a partner in a firm at some time), and a series of job title dummies.⁵⁹

The regression results for the controls only are presented in Table 4.2.⁶⁰ These results are consistent with previous economic studies: experience has a decreasingly increasing impact on compensation; women with higher degrees earn more than do those with an undergraduate degree only.

Men in both business and engineering programs earn more than do those in liberal arts majors. The sign on Ph.D. is also positive, but insignificant. The signs on GPA (an imperfect proxy for ability) and on Entrepreneur depend on who reports the compensation level. The sign on graduation year is positive (but insignificant), indicating that more recent graduates earn more than similar previous graduates earn. This result is counter-intuitive. Indeed, the coefficient is insignificant for men, as expected, but positive and significant for women, indicating perhaps that earnings discrimination against women has decreased over the decades.

⁵⁹ Including firm size had no significant impact on coefficients and limited the sample size unacceptably.

⁶⁰ Pooled regressions failed to pass the omitted variables test.

Table 4.2. Regression results, controls only

Men				
	Self-reported Compensation		Boss-reported compensation	
	Coefficient	p-value	Coefficient	p-value
Experience	.2822	0.076	.1854	0.142
Experience ²	-.0039	0.000	-.0026	0.007
Grad. year	.1169	0.463	.0544	0.673
GPA	-.0034	0.624	-.0042	0.542
Master's degree	.5309	0.092	.2769	0.283
Ph.D.	.1242	0.834	-.0919	0.857
Business	.2756	0.172	.4103	0.024
Engineering	.2783	0.122	.3695	0.039
Entrepreneur	-.1588	0.066	-.1036	0.238
Constant	-9.5353	0.518	-3.5225	0.767
N	177		177	
Adj. R ²	0.6918		0.6542	
Ramsey	0.4003		0.9846	
Women				
Experience	.4316	0.017	.3748	0.065
Experience ²	-.0008	0.706	-.0060	0.780
Grad. year	.3697	0.046	.3130	0.122
GPA	.0046	0.666	-.0060	0.654
Master's degree	.7434	0.059	.4896	0.255
Ph.D.	2.1897	0.001	2.1737	0.001
Business	-.0559	0.718	.0978	0.621
Engineering	-.1195	0.450	.0045	0.981
Entrepreneur	.1454	0.384	-.1221	0.555
Constant	-33.6470	0.049	-27.5352	0.141
N	104		104	
Adj. R ²	0.3069		0.2377	
Ramsey	0.6532		0.5964	

Note: Regressions run with robust standard errors. Job title dummies included in controls.

4.4 Supervisor assessments vs. self-assessments

The use of both employer and employee responses to the same questions is extremely uncommon in the literature. Indeed, the only study I have been able to locate which includes and compares employer and employee responses to the same questions is Elliot and Sandy (1998), but the questions in that survey pertain to employer-offered benefits and opportunities, rather than employee personality traits. Barrick and Mount (1993) take the average of employer and employee responses to questions about job

autonomy, rather than investigate the differences between them. I have been unable to find any previous personality study with both self-reported and supervisor evaluated personality traits; most studies of personality and earnings rely on self-assessments or professional or peer evaluations. In this section, I reveal how self-assessments and supervisor assessments differ and how these differences affect the resulting estimates.

4.4.1 Supervisor assessments and self-assessments differ

The employee and supervisor responses to questions regarding eleven personality traits are presented in Tables 4.3-4.13. The final column of each table contains the response distribution of self-assessments drawn from the entire original sample; the number of original responses is in the lower right-hand corner. Only three-quarters of survey respondents answered these questions. Of those, fewer than half have corresponding supervisor surveys. This raises the natural question of self-selection. By comparing the two rightmost columns, we find that the self-assessment distributions are nearly identical for each trait. There is an almost imperceptible pattern of choosing the middle response more often in the full sample, possibly indicating indifference, which might help to explain a lack of supervisor assessment. The final trait, “seeks economic progress” is somewhat stronger in the whole sample than in the sub-sample. This is reasonable, since the self-employed and company CEOs are in the full sample but not in the sub-sample with supervisor surveys.⁶¹ Overall, the comparison of distributions inspires confidence that any self-selection into the reduced sample is minimal.

⁶¹ Self-reported salaries are also higher in the original sample than in the reduced sample, another difference consistent with the self-employed or CEO presence in the former and absence in the latter.

Table 4.3. Self-assessment vs. supervisor evaluation: Open-mindedness

Self-assessment	Supervisor's assessment					Sub-sample		Full sample %
	1	2	3	4	5	Total	%	
1	35	40	8	1	0	84	31.11	28.80
2	45	89	19	0	0	153	56.67	56.87
3	8	18	2	1	0	29	10.74	12.64
4	2	2	0	0	0	4	1.48	1.58
5	0	0	0	0	0	0	0.00	0.12
Total	90	149	29	2	0	270	100.00	100.00
%	33.33	55.19	10.74	0.74	0.00	100.00		Obs.
Pearson $\chi^2(9) = 10.0711$ Pr = 0.345								823

Table 4.4. Self-assessment vs. supervisor evaluation: High work standards

Self-assessment	Supervisor's assessment					Sub-sample		Full sample %
	1	2	3	4	5	Total	%	
1	128	50	7	1	0	186	68.63	65.46
2	43	28	7	1	0	79	29.15	31.40
3	0	1	1	0	0	2	0.74	2.17
4	3	0	0	0	0	3	1.11	0.85
5	1	0	0	0	0	1	0.37	0.12
Total	175	79	15	2	0	271	100.00	100.00
%	64.58	29.15	5.54	0.74	0.00	100.0		Obs.
Pearson $\chi^2(12) = 17.1543$ Pr = 0.144								828

Table 4.5. Self-assessment vs. supervisor evaluation: Creative

Self-assessment	Supervisor's assessment					Sub-sample		Full sample %
	1	2	3	4	5	Total	%	
1	39	30	13	1	0	83	31.09	30.86
2	46	59	16	1	0	122	45.69	45.08
3	21	26	8	2	0	57	21.35	20.90
4	1	1	1	0	0	3	1.12	2.67
5	1	1	0	0	0	2	0.75	0.49
Total	108	117	38	4	0	267	100.00	100.00
%	40.45	43.82	14.23	1.50	0.00	100.00		Obs.
Pearson $\chi^2(12) = 6.5121$ Pr = 0.888								823

Table 4.6. Self-assessment vs. supervisor evaluation: Works hard

Self-assessment	Supervisor's assessment					Sub-sample		Full sample %
	1	2	3	4	5	Total	%	
1	124	47	5	0	0	176	65.67	61.74
2	51	25	5	1	0	82	30.60	33.54
3	3	1	1	0	0	5	1.87	3.51
4	1	0	0	0	0	1	0.37	0.48
5	4	0	0	0	0	4	1.49	0.73
Total	183	73	11	1	0	268	100.00	100.00
%	68.28	27.24	4.10	0.37	0.00	100.00		Obs.
Pearson $\chi^2(12) = 10.1775$ Pr = 0.600								826

Table 4.7. Self-assessment vs. supervisor evaluation: Visionary

	Supervisor's assessment					Sub-sample		Full sample %	
	1	2	3	4	5	Total	%		
Self-assessment	1	26	37	12	2	0	77	28.95	25.18
	2	33	51	28	1	0	113	42.48	45.97
	3	15	27	19	2	0	63	23.68	23.84
	4	3	7	2	0	0	12	4.51	4.65
	5	0	1	0	0	0	1	0.38	0.37
Total	77	123	61	5	0	266	100.00	100.00	
%	28.95	46.24	22.93	1.88	0.00	100.00		Obs.	
Pearson $\chi^2(12) = 8.2564$ Pr = 0.765									818

Table 4.8. Self-assessment vs. supervisor evaluation: Takes risks

	Supervisor's assessment					Sub-sample		Full sample %	
	1	2	3	4	5	Total	%		
Self-assessment	1	18	20	15	0	1	54	20.00	19.90
	2	21	57	35	6	3	122	45.19	40.53
	3	7	29	26	10	0	72	26.67	29.85
	4	0	10	9	1	0	20	7.41	8.62
	5	1	0	0	1	0	2	0.74	1.09
Total	47	116	85	18	4	270	100.00	100.00	
%	17.41	42.96	31.48	6.67	1.48	100.00		Obs.	
Pearson $\chi^2(16) = 37.6262$ Pr = 0.002									824

Table 4.9. Self-assessment vs. supervisor evaluation: Flexible

	Supervisor's assessment					Sub-sample		Full sample %	
	1	2	3	4	5	Total	%		
Self-assessment	1	26	28	12	5	0	71	26.20	24.02
	2	25	63	18	4	1	111	40.96	41.22
	3	18	34	17	2	0	71	26.20	29.51
	4	4	6	4	1	0	15	5.54	4.02
	5	1	1	0	0	1	3	1.11	1.22
Total	74	132	51	12	2	271	100.00	100.00	
%	27.31	48.71	18.82	4.43	0.74	100.00		Obs.	
Pearson $\chi^2(16) = 55.4022$ Pr = 0.000									820

Table 4.10. Self-assessment vs. supervisor evaluation: Responsible

	Supervisor's assessment					Sub-sample		Full sample %	
	1	2	3	4	5	Total	%		
Self-assessment	1	167	37	2	0	0	206	76.87	73.24
	2	35	14	4	1	0	54	20.15	24.21
	3	2	1	1	0	0	4	1.49	1.57
	4	1	0	0	0	0	1	0.37	0.36
	5	3	0	0	0	0	3	1.12	0.61
Total	208	52	7	1	0	268	100.00	100.00	
%	77.61	19.40	2.61	0.37	0.00	100.00		Obs.	
Pearson $\chi^2(12) = 22.9750$ Pr = 0.028									826

Table 4.11. Self-assessment vs. supervisor evaluation: Works well in teams

	Supervisor's assessment					Sub-sample		Full sample %	
	1	2	3	4	5	Total	%		
Self-assessment	1	86	35	13	0	0	134	49.63	48.31
	2	56	33	5	3	0	97	35.93	37.29
	3	14	11	6	1	0	32	11.85	11.38
	4	2	0	1	0	0	3	1.11	1.94
	5	2	1	1	0	0	4	1.48	1.09
Total	160	80	26	4	0	270	100.00	100.00	
	59.26	29.63	9.63	1.48	0.00	100.00		Obs.	
Pearson $\chi^2(12) = 16.2056$ Pr = 0.182									826

Table 4.12. Self-assessment vs. supervisor evaluation: Loyal

	Supervisor's assessment					Sub-sample		Full sample %	
	1	2	3	4	5	Total	%		
Self-assessment	1	139	43	10	2	0	194	72.12	73.21
	2	42	13	6	1	1	63	23.42	23.39
	3	7	2	0	0	0	9	3.35	2.55
	4	1	0	0	0	0	1	0.37	0.24
	5	2	0	0	0	0	2	0.74	0.61
Total	191	58	16	3	1	269	100.00	100.00	
	71.00	21.56	5.95	1.12	0.37	100.00		Obs.	
Pearson $\chi^2(16) = 7.1135$ Pr = 0.971									825

Table 4.13. Self-assessment vs. supervisor evaluation: Seeks economic advancement

	Supervisor's assessment					Sub-sample		Full sample %	
	1	2	3	4	5	Total	%		
Self-assessment	1	86	52	10	0	1	149	55.39	60.99
	2	44	41	6	2	0	93	34.57	29.95
	3	7	8	5	1	0	21	7.81	7.49
	4	0	2	0	0	0	2	0.74	0.48
	5	2	1	1	0	0	4	1.49	1.09
Total	139	104	22	3	1	269	100.00	100.00	
%	51.67	38.66	8.18	1.12	0.37	100.00		Obs.	
Pearson $\chi^2(16) = 21.6774$ Pr = 0.154									828

As Tables 4.3-4.13 demonstrate, the self-assessed values for personality traits differ from supervisor assessments for the same traits.⁶² Two important patterns can be

⁶² The highest correlation between self- and supervisor-assessments for the same trait revealed by a correlation matrix 0.2128, for Risk-taker. Correlations were higher among assessments by the same evaluator than between the assessments for a given trait. Principal components analysis reveals two major components: the first is related to similar scores on all characteristics for both assessors, while the second causes better self-assessments and worse supervisor-assessments. The two components, however, account for only 42% of the variance. Principal factor analysis retains twelve factors; the first two explain 83% of the variance. Principal-components factor analysis retains five factors, explaining 60% of the variance.

observed. First, for most characteristics we cannot reject the null hypothesis of independent distributions at the 0.10 level (for Flexible, Responsible, and Risk-taking we reject the null at the 0.05 level); indeed, for most characteristics the self-evaluation and the supervisor evaluation coincide less than 50% of the time. Second, the self-evaluations exceed (numerically) the supervisor assessments more often than vice-versa: bosses think more highly of their employees than do the employees themselves.⁶³ Thus, it is clear that self-assessments are poor proxies for employer valuations.

Of course, Tables 4.3-4.13 include only the observations with both assessments for a given personality trait. In the sub-sample, more employee responses to personality questions are missing than supervisor responses. To test for self-selection, Table 4.14 provides the frequency of boss assessments for observations missing self-assessments and the distributions for observations both missing and including self-assessments. The group missing self-evaluations received worse assessments from their supervisors on High Standards, Creative, Hard Worker, and Teamwork. For Loyalty, all but two were evaluated better than those who reported self-assessments, but those two received scores of 5. Indeed, supervisor scores of 5 are more frequent in the observations missing self-assessments than in those that include them. This leads us to conclude that self-assessments may be biased slightly upward, for those who know that they should rate themselves low are more likely to omit their responses. In studies that rely on self-assessed personality traits, this self-selection bias should be taken into account.⁶⁴

⁶³ This relationship is not obvious from the means in Table 4.1.

⁶⁴ For traits missing more than ten observations, the average compensation is lower than in the sample with self-assessments. It is impossible, however, to determine the direction of the coefficients' biases, since we do not know and cannot estimate the appropriate values of these missing self-assessments.

Table 4.14. Supervisor assessments for observations with and without self-assessments

Supervisor assessment	1	2	3	4	5	N
Open-minded	19	20	3	1	0	43
distribution without self-assess	44.19%	46.51%	6.98%	2.33%	0%	
with self-assess	33.33%	55.19%	10.74%	0.74%	0%	270
High Standards	20	15	6	0	1	42
distribution without self-assess	47.62%	35.71%	14.29%	0%	2.38%	
with self-assess	64.58%	29.15%	5.54%	0.74%	0%	271
Creative	17	19	7	1	1	45
distribution without self-assess	37.78%	42.22%	15.56%	2.22%	2.22%	
with self-assess	40.45%	43.82%	14.23%	1.50%	0%	267
Hard worker	28	13	2	0	1	44
distribution without self-assess	63.64%	29.55%	4.55%	0%	2.27%	
with self-assess	68.28%	27.24%	4.10%	0.37%	0%	268
Visionary	3	2	1	0	0	6
distribution without self-assess	50.00%	33.33%	16.67%	0%	0%	
with self-assess	28.95%	46.24%	22.93%	1.88%	0%	266
Risk-taker	0	2	1	0	0	3
distribution without self-assess	0%	66.67%	33.33%	0%	0%	
with self-assess	17.41%	42.96%	31.48%	6.67%	1.48%	270
Flexible	0	1	2	0	0	3
distribution without self-assess	0%	33.33%	66.67%	0%	0%	
with self-assess	27.31%	48.71%	18.82%	4.43%	0.74%	271
Responsible	25	15	1	0	1	42
distribution without self-assess	59.52%	35.71%	2.38%	0%	2.38%	
with self-assess	77.61%	19.40%	2.61%	0.37%	0%	268
Teamwork	21	17	2	1	1	42
distribution without self-assess	50.00%	40.48%	4.76%	2.38%	2.38%	
with self-assess	59.26%	29.63%	9.63%	1.48%	0%	270
Loyal	32	10	0	0	2	44
distribution without self-assess	72.73%	22.73%	0%	0%	4.55%	
with self-assess	71.00%	21.56%	5.95%	1.12%	0.37%	269
Advancement-seeker	2	1	0	0	0	3
distribution without self-assess	66.67%	33.33%	0%	0%	0%	
with self-assess	51.67%	38.66%	8.18%	1.12%	0.37%	269

4.4.2 Supervisor assessments and self-assessments give different results

Even in the regressions involving the controls only (Table 4.2), it matters whether compensation is self-reported or supervisor-reported. For example, boss-reported compensation is better explained by the variables than is self-reported compensation for men. In the boss-reported compensation regression, the two college major dummies are significant, while they are not in the self-reported compensation regression; for master's degree, the opposite is true.

For women, on the other hand, self-reported compensation is slightly better explained by these controls than is supervisor-reported compensation. As with men, master's degree is significant in the self-reported compensation regression, but not in the boss-reported compensation regression. Year of graduation is also significant in the former regression only.

Turning to the personality estimates (Tables 4.15 and 4.16), again the boss-reported compensation is better explained than self-reported compensation for men, while the opposite is true for women. For men, only boss-reported "hard worker" has a significant coefficient in the boss-reported compensation regression. Although "creative" has coefficients on the two assessments that differ significantly at the 0.10 level, each coefficient is insignificant.

For women (self-reported compensation), the coefficient on self-reported "high standards" differs significantly at the 0.05 level from that on boss-reported "high standards", but only the former coefficient is significant at the 0.05 level, indicating that self-assessed high standards are associated with higher income, while supervisor-assessed high standards have a non-positive effect on income. Although the coefficients on "creative" differ significantly from each other at the 0.05 level and are of opposite signs, neither coefficient is significant.

Table 4.15. Regression results, full model, men

	Self-reported compensation		Boss-reported compensation	
	Coefficient	p-value	Coefficient	p-value
Experience	.3185	0.047	.2006	0.171
Experience ²	-.0029	0.004	-.0011	0.226
Grad. year	.1826	0.248	.1144	0.431
GPA	.0018	0.829	-.0018	0.817
Master's degree	.5786	0.066	.4598	0.114
Ph.D.	.3738	0.514	.1797	0.705
Business	.3928	0.092	.5583	0.002
Engineering	.2986	0.181	.4900	0.004
Entrepreneur	-.2510	0.022	-.1581	0.106
Self-assessed personality traits				
Open-minded	-.0560	0.545	-.1101	0.165
High standards	-.1638	0.115	-.0886	0.446
Creative	.1407	0.076	.1038	* 0.215
Hard Worker	.0470	0.671	.0174	0.888
Visionary	.0188	0.816	.0856	0.244
Risk-taker	-.0312	0.574	-.0214	0.722
Flexible	-.0375	0.572	.0402	0.452
Responsible	.0375	0.798	.0283	0.825
Teamwork	-.0276	0.708	.0081	0.913
Loyal	-.0319	0.789	-.0157	0.881
Seeks Advancement	.0463	0.573	-.0310	0.768
Boss-assessed personality traits				
Open-minded	.0681	0.528	-.0744	0.406
High standards	-.0261	0.773	-.0176	0.835
Creative	-.0805	0.280	-.1102	0.120
Hard Worker	.0902	0.314	.2500	0.003
Visionary	-.1417	0.070	-.0197	0.747
Risk-taker	.0432	0.469	-.0068	0.903
Flexible	-.0419	0.515	.1005	0.193
Responsible	.0513	0.665	.0012	0.992
Teamwork	.0706	0.345	-.0909	0.206
Loyal	.0547	0.530	-.0645	0.423
Seeks Advancement	-.0853	0.133	-.0010	0.985
Constant	-15.6711	0.287	-9.2159	0.492
N	144		144	
Adj. R ²	0.7778		0.7636	
Ramsey RESET test	0.0359		0.3963	

Notes: regressions run with robust variance. Job title dummies included in controls. Dependent variable is the natural logarithm of income.

* can reject the hypothesis that the self-assessed and supervisor-assessed coefficients are the same at the 10% level.

** can reject the hypothesis that the self-assessed and supervisor-assessed coefficients are the same at the 5% level.

Table 4.16. Regression results, full model, Women

	Self-reported compensation			Boss-reported compensation	
	Coefficient	p-value		Coefficient	p-value
Female					
Experience	.5010	0.017		.2089	0.524
Experience ²	.0011	0.631		-.0003	0.906
Grad. year	.4374	0.038		.1504	0.648
GPA	.0056	0.705		-.0103	0.542
Master's degree	.6653	0.150		.0506	0.940
Ph.D.	2.5014	0.000		2.0727	0.056
Business	-.1072	0.662		.2968	0.378
Engineering	-.1116	0.603		.1598	0.604
Entrepreneur	-.1124	0.614		-.1002	0.690
Self-assessed personality traits					
Open-minded	-.2222	0.144		-.1873	0.312
High standards	-.5624	0.030	**	-.0986	0.683
Creative	.1159	0.203	**	.0997	0.435
Hard Worker	.1387	0.316		.0332	0.856
Visionary	-.0686	0.464		-.0224	0.851
Risk-taker	-.0422	0.672		-.0051	0.964
Flexible	-.0699	0.514		-.0127	0.920
Responsible	.1322	0.503		-.2417	0.376
Teamwork	.2371	0.009		.0914	0.490
Loyal	.1868	0.176		.0533	0.790
Seeks Advancement	-.1930	0.130		-.0834	0.564
Boss-assessed personality traits					
Open-minded	-.0009	0.994		.1619	0.341
High standards	.0805	0.635		.6539	0.007
Creative	-.2045	0.105		-.1676	0.236
Hard Worker	.0362	0.826		-.2308	0.245
Visionary	-.0043	0.977		-.2091	0.235
Risk-taker	-.0145	0.904		-.1653	0.268
Flexible	-.0121	0.921		.1143	0.400
Responsible	.1883	0.408		.0295	0.913
Teamwork	.1657	0.463		-.0043	0.982
Loyal	.1643	0.212		.0768	0.623
Seeks Advancement	.0086	0.939		.0149	0.906
Constant	-39.6987	0.044		-11.9423	0.699
N	82			82	
Adj. R ²	0.6487			0.5399	
Ramsey RESET test	0.8691			0.0044	

Notes: regressions run with robust variance. Job title dummies included in controls. Dependent variable is the natural logarithm of income.

* can reject the hypothesis that the self-assessed and supervisor-assessed coefficients are the same at the 10% level.

** can reject the hypothesis that the self-assessed and supervisor-assessed coefficients are the same at the 5% level.

When traits are used individually as regressors with the controls (Tables 4.17 and 4.18), very little is revealed. Although most of the regressions pass the Ramsey RESET test for omitted variables, a larger proportion of the coefficients is statistically insignificant. An F-test of the equality of the coefficients revealed that “creative” and “visionary” have statistically distinct coefficients on boss-reported and self-reported traits in both compensation regressions for men, while “risk-taker” has distinct coefficients in the boss-reported compensation equation only. In each case, the self-reported trait is inversely related to compensation, while the supervisor evaluation is positively associated with compensation.

In the women’s regressions (Table 4.18), more of the regressions pass the Ramsey RESET test for omitted variables, but of these, only one reveals a distinct coefficient on each of the two evaluations. Self-assessed “Open-minded” has a positive influence on earnings, while the supervisor assessment of the same trait has no significant effect. We cannot, according to an F-test of the equality of coefficients, assert that any of the remaining traits have distinct coefficients on the two assessments. This failure, however, is largely due to the fact that most of the coefficients, themselves, are statistically insignificant. The small sample size may be limiting our ability to measure the marginal effects of personality on compensation.

Table 4.17. Coefficients on personality traits, regressed separately with controls, Men

	Self-reported compensation				Boss-reported compensation			
	Coeff.	p-value	Tests		Coeff.	p-value	Tests	
Open-minded self	-.0464	0.470	Adj. R ²	0.7235	-.0660	0.270	Adj. R ²	0.7000
Open-minded boss	-.0306	0.642	Ramsey	0.2514	-.1814	0.009	Ramsey	0.0602
N	154				154			
High standards self	-.0805	0.120	Adj. R ²	0.7289	-.0224	0.643	Adj. R ²	0.6845
High standards boss	-.0494	0.399	Ramsey	0.0817	-.0946	0.112	Ramsey	0.0913
N	153				153			
Creative self	.0325	0.470	Adj. R ²	0.7273	.0638	0.173	Adj. R ²	0.7000
Creative boss	-.0922	0.062	Ramsey	0.1108	-.1430	0.008	Ramsey	0.0997
N	152				152			
Hard Worker self	-.0207	0.590	Adj. R ²	0.7232	.0205	0.579	Adj. R ²	0.6805
Hard Worker boss	.0680	0.264	Ramsey	0.1767	.0897	0.192	Ramsey	0.7441
N	152				152			
Visionary self	.0256	0.551	Adj. R ²	0.7342	.0967	0.021	Adj. R ²	0.7079
Visionary boss	-.1134	0.021	Ramsey	0.2517	-.0706	0.179	Ramsey	0.0561
N	151				151			
Risk-taker self	-.0368	0.385	Adj. R ²	0.7284	.0474	0.283	Adj. R ²	0.6848
Risk-taker boss	-.0143	0.752	Ramsey	0.2275	-.0866	0.098	Ramsey	0.4196
N	152							
Flexible self	-.0674	0.121	Adj. R ²	0.7270	.0002	0.995	Adj. R ²	0.6785
Flexible boss	-.0199	0.699	Ramsey	0.1329	-.0330	0.611	Ramsey	0.5259
N	153				153			
Responsible self	-.0111	0.783	Adj. R ²	0.7227	.0155	0.715	Adj. R ²	0.6814
Responsible boss	.0438	0.579	Ramsey	0.1798	-.0905	0.296	Ramsey	0.3251
N	153				153			
Teamwork self	-.0619	0.146	Adj. R ²	0.7263	-.0059	0.889	Adj. R ²	0.6854
Teamwork boss	.0491	0.436	Ramsey	0.2546	-.0983	0.116	Ramsey	0.2897
N	153				153			
Loyal self	-.0378	0.427	Adj. R ²	0.7263	.0127	0.775	Adj. R ²	0.6866
Loyal boss	.0581	0.299	Ramsey	0.2043	-.0377	0.488	Ramsey	0.6321
N	151				151			
Advancement self	-.0011	0.974	Adj. R ²	0.7249	.0388	0.457	Adj. R ²	0.6882
Advancement boss	-.0753	0.112	Ramsey	0.2594	-.0852	0.083	Ramsey	0.5428
N	152				152			

Notes: The sample size in each regression was limited by the number of self-reported or boss-reported values, usually the former. “Ramsey” is the Ramsey RESET test statistic for omitted variables. “equal” is a test statistic for the null hypothesis: self-assessed coefficient = supervisor-assessed coefficient

Table 4.18. Coefficients on personality traits, regressed separately with controls, Women

	Self-reported compensation				Boss-reported compensation			
	Coeff.	p-value	Tests		Coeff.	p-value	Tests	
Open-minded self	-.3303	0.001	Adj. R ²	0.4181	-.2488	0.026	Adj. R ²	0.2802
Open-minded boss	.0045	0.962	Ramsey	0.3318	.0371	0.749	Ramsey	0.3851
N	90				90			
High standards self	-.3838	0.055	Adj. R ²	0.3566	-.1493	0.503	Adj. R ²	0.2391
High standards boss	.1143	0.302	Ramsey	0.0454	.1067	0.393	Ramsey	0.3555
N	92				92			
Creative self	-.0327	0.693	Adj. R ²	0.3333	.0040	0.967	Adj. R ²	0.2767
Creative boss	-.0819	0.321	Ramsey	0.4806	-.1437	0.116	Ramsey	0.8919
N	90				90			
Hard Worker self	-.0219	0.862	Adj. R ²	0.3243	-.0921	0.535	Adj. R ²	0.2548
Hard Worker boss	.0841	0.494	Ramsey	0.1777	-.0771	0.587	Ramsey	0.5028
N	90				90			
Visionary self	-.1093	0.157	Adj. R ²	0.3396	-.0231	0.832	Adj. R ²	0.2967
Visionary boss	-.0116	0.898	Ramsey	0.0919	-.1834	0.081	Ramsey	0.5110
N	89				89			
Risk-taker self	-.0956	0.218	Adj. R ²	0.3295	-.0834	0.414	Adj. R ²	0.2612
Risk-taker boss	-.0571	0.424	Ramsey	0.0622	-.1185	0.163	Ramsey	0.2471
N	92				92			
Flexible self	-.0506	0.484	Adj. R ²	0.3194	-.0264	0.774	Adj. R ²	0.2285
Flexible boss	-.0516	0.488	Ramsey	0.3649	.0048	0.961	Ramsey	0.7676
N	92				92			
Responsible self	-.1081	0.513	Adj. R ²	0.3344	-.2578	0.097	Adj. R ²	0.2579
Responsible boss	.1593	0.271	Ramsey	0.9444	.0548	0.703	Ramsey	0.6885
N	90				90			
Teamwork self	.1616	0.056	Adj. R ²	0.3380	.1719	0.092	Adj. R ²	0.2846
Teamwork boss	.0682	0.486	Ramsey	0.5508	-.1134	0.339	Ramsey	0.2826
N	91				91			
Loyal self	.1565	0.117	Adj. R ²	0.3279	.0553	0.725	Adj. R ²	0.2292
Loyal boss	.1184	0.264	Ramsey	0.6108	-.0164	0.911	Ramsey	0.9204
N	92				92			
Advancement self	-.0473	0.640	Adj. R ²	0.3052	.0046	0.974	Adj. R ²	0.2576
Advancement boss	-.0644	0.482	Ramsey	0.2844	-.0976	0.281	Ramsey	0.6442
N	91				91			

Notes: The sample size in each regression was limited by the number of self-reported or boss-reported values, usually the former. “Ramsey” is the Ramsey RESET test statistic for omitted variables. “equal” is a test statistic for the null hypothesis: self-assessed coefficient = supervisor-assessed coefficient

4.4.3 Which is better?

With supervisor and self-reported values differing so much, which should we use? For compensation, this question is sensible: one reported level may be more accurate than the other. This is possible because compensation is an objective variable.⁶⁵ Since we do not have official compensation in the database for comparison, we can only speculate. However, men report higher compensation levels on average than their supervisors report for them, while women tend to under-report relative to their supervisors (Table 4.1).⁶⁶ There are two possible explanations: either the supervisors report lower-than-actual compensation for their male employees and higher-than-actual compensation for women, or the two groups of employees have different reporting patterns. I find the latter more convincing. The fact that men's boss-reported compensation is better explained by the controls than is self-reported compensation, while either compensation is approximately as well explained as the other for women, supports this theory. Men's self-reported salaries seem to be high for their characteristics.

In terms of personality, however, which assessment to use depends on the answer to another question: for what? The two sets of measures of personality traits simply reveal different things about personality and earnings. As McCrae and John (1992: 192) point out, there are "sharp distinctions between observer ratings of personality, which are said to represent the public self or social reputation, and self-reports, which reflect inner drives and dispositions."

⁶⁵ Notwithstanding, Elliot and Sandy (1998) demonstrate that employee and employer responses may vary significantly, even for "objective" variables.

Self-assessments are valuable, if we can trust the employees to report honestly,⁶⁷ because each person presumably knows herself better than anyone else knows her and is therefore especially qualified to provide a thorough evaluation. We expect self-reported traits to be reflected in behavior which is (or is not) rewarded with a wage differential, so that self-assessments influence earnings *indirectly*. Previous studies have focused on self-assessments or professional evaluations out of necessity, perhaps, but these give us little insight into the kind of behavior that is *directly* rewarded in the labor market. As demonstrated above, there are also important differences between self-reported and supervisor-reported evaluations.

Supervisor assessments, on the other hand, give us a measure of how the employee's personality is *perceived* by his or her employer, as represented in the supervisor. Since the supervisor is also responsible, in most cases, for deciding raises and promotions, these measures allow us to estimate the value attached to each trait. For example, the employee may be the kind of person who is apt to take risks, but if he is in a position with limited decision-making, the supervisor may not perceive that aptitude and certainly will not value it. Thus, supervisor assessments yield better estimates of the value employers place directly on personality traits.

⁶⁶ Women report the same level as the supervisor 72% of the time; 15% report lower levels than their supervisors; 11% report higher levels. Men coincide with their supervisors 66% of the time; 14% report lower levels; 21% report higher levels.

⁶⁷ In my sample, there is more correlation among the self-assessed traits than among the supervisor evaluations, which may or may not indicate that the supervisors put more thought into the choices they marked.

4.5 Personality and compensation

In this section, I examine the impact of individual personality traits on compensation. The effect of each trait largely depends on whether it is self-assessed or supervisor assessed. Self-reported values represent inherent characteristics that may or may not be observed, so they influence earnings indirectly through on-the-job behavior. Supervisor evaluations, on the other hand, are the observed levels of a given trait and thus give us a direct estimate of the value employers place on that trait. It is possible for an employee to possess a characteristic without the supervisor observing it, especially if the characteristic is little related with the demands of the job. Conversely, an employee may have formed a self-image that includes low levels of certain characteristics that develop on the job, and thus are observed to be high. It is also possible for the self-assessment and the supervisor evaluation to have conflicting effects on compensation.

As demonstrated in Section 4.4.2, there is some self-selection due to missing self-assessments. This selectivity results in biased estimates, but we cannot identify the direction of the bias. We know, for example, that supervisor assessments tend to be lower for those observations missing self-assessments, and average compensation is also lower in most cases, but the relationship between traits and compensation is unclear. For self-assessed traits, it is impossible even to speculate on the relationship for the observations missing self-assessments. Since most of the coefficients on personality traits are insignificant at the 0.10 level, it is unlikely that the bias is of great consequence. Where the coefficients are significant, it could be argued that the bias would not change the sign, but only the size of the relevant coefficient.

4.5.1 Motivation

My findings on motivational traits are mixed.⁶⁸ The conclusion depends, in part, on who evaluates the traits and the gender of the employee. It also depends on how motivation is defined: while Hard Work and Responsibility seem to have negative wage differentials attached to them, High Standards and, especially, Achievement-seeking are more closely related to higher earnings.

High standards. The coefficient on this trait is most often negative (but insignificant), indicating a positive relationship between High Work Standards and compensation. For women, however, boss-assessed high standards have the opposite effect. Evidently, women who think they have high work standards earn more, while those who are so perceived by their supervisors earn less. For men, the coefficient is always negative; for women, the coefficient on supervisor-assessed high standards is positive and significant at the 0.01 level in the boss-reported earnings regression.⁶⁹ When this trait is regressed alone with the controls (Tables 4.17 and 4.18), the same pattern holds.

Hard worker. This trait is the most closely related to work ethic. Ironically, of the eight easily-classified traits in this survey, it is the one that most often has a positive coefficient in the detailed regressions (Tables 4.15-4.18). In particular, where the coefficient on this variable is significant, it is positive, indicating an inverse relationship with compensation. Thus, there is some evidence that those who work harder, earn less.

⁶⁸ I also tested each trait interacted with GPA as a proxy for ability (O'Reilly and Chatman, 1994), but the results were insignificant.

Responsible. In the full equations, Responsibility is almost always associated with a negative effect on compensation. When regressed alone with the controls (Tables 4.17 and 4.18), however, the results for men are truly mixed: the coefficient is never significant, and is positive nearly as often as it is negative in the detailed regressions. For women, self-assessed Responsibility has a negative coefficient in each regression, signaling a positive influence on income, while boss-assessed Responsibility has an insignificant positive coefficient. Women who see themselves as Responsible earn more.

Advancement-seeker. This “Machiavellian” trait exhibits the expected relationship with earnings for men: positive. In the boss-reported compensation regression, both coefficients are negative. When regressed alone with the controls (Table 4.17), the coefficient on supervisor-assessed Advancement is negative and significant at the 0.10 level in the boss-reported compensation regression.

Not so for women. In the full regressions (Table 4.16), the coefficients on self-assessed Advancement are negative but insignificant, while those on boss-assessed Advancement are positive and insignificant. In the trait-specific regressions (Table 4.18), three of four coefficients are negative, but all are insignificant.

What is, perhaps, most striking about this trait is that it is rewarded more highly in men than in women. This takes the Daymont and Andrisani (1984) and Long (1995) findings one step further: supervisor-observed male traits are rewarded *for men*, but not for women.

⁶⁹ When an interacted term is included, both assessments for women have highly significant negative coefficients, while the interacted term has a highly significant positive coefficient (self-reported compensation).

4.5.2 Openness to Experience

Unlike Motivation, supervisor-assessed Openness has a strong positive influence on compensation in my sample. Previous studies have found Openness to be less important than Motivation in determining earnings. If we were to focus on self-assessed traits only or averages of self and supervisor assessments, we would find the same result as in those studies. This is a clear example of the importance of using both self-reports and supervisor evaluations to identify the value employers place on personality traits.

Open-minded. Women who perceive themselves as Open-minded earn more, while their supervisors' assessments have no significant impact on earnings. For men, all coefficients (except in the first regression of Table 4.15, which fails to pass the omitted variables test) are negative, but insignificant.⁷⁰ Thus, there is weak evidence that Open-mindedness is associated with higher earnings, especially for women.

Creative. For both genders, in the full regressions (Tables 4.15 and 4.16), self-assessed Creativity is associated with lower earnings, while supervisor-assessed Creativity contributes to higher earnings. Each effect, however, is insignificant. In the trait-specific regressions (Tables 4.17 and 4.18), men derive a strong benefit from supervisor-assessed Creativity, while self-assessed Creativity has an insignificant, negative impact on earnings. For women, the impact of Creativity is non-negative but insignificant. This is one of only a few traits with statistically significant differences in the self-assessed and supervisor-assessed coefficients.

⁷⁰ The boss-reported earnings regression in Table 4.17 fails to pass the Ramsey RESET test for omitted variables.

Visionary. For women, Vision is associated with an insignificant positive impact on income. For men, this is true of boss-assessed Vision, but self-assessed Vision has insignificant positive coefficients: the effect on income is non-positive. In the trait-specific regressions of Tables 4.17 and 4.18, the positive influence of Vision is significant. at the 0.10 level in each equation that satisfies the specification test.

Flexible. It appears that flexibility has no influence on earnings for men or women.

4.5.3 Other traits

Risk-taker. The impact of Risk-taking on earnings seems to be positive, as all the associated coefficients in Tables 4.15 and 4.16 indicate, but each of these coefficients is statistically insignificant. When regressed with the controls only, boss-assessed Risk-taking has a significant positive impact on the boss-reported earnings of men (Table 4.17). For women (Table 4.18), the positive influence is insignificant. Overall (Table 4.21), Risk-taking is associated with higher earnings, more so for men than for women. This finding contradicts that of Bartlett and Miller (1985).

Team worker. The ability to work well in teams is not rewarded with higher earnings. In particular, women who perceive themselves as good team players earn less (Table 4.18). For men, this variable is insignificant, but the coefficients are negative. The overall results are a significant negative impact on compensation for women and an insignificant positive effect for men (Tables 4.20 and 4.21). Although teamwork is

encouraged in modern didactic trends, there is no evidence here to support the idea that those who work well in teams are more successful.⁷¹

Loyal. Although none of the coefficients is significant, Loyalty is associated more with a positive impact on men's earnings and a negative effect on women's earnings in the full regressions (Tables 4.15 and 4.16). In the trait-specific regressions, the effect is unclear and insignificant.

4.5.4 Personality and promotions

Table 4.19 summarizes the results of regressions explaining position. The dependent variable in each regression is Job Title, which is coded from 1 to 7 in roughly descending order of importance: Owner, Board of Directors, President, Manager, etc. Due to the descending order, a negative coefficient on a control variable means that that variable is associated with ascension, while a positive coefficient on a personality trait is required for the same interpretation.

The first important difference between these regressions and the earnings regressions is that there are more significant coefficients in this table than in the compensation tables. This is especially true for women. The only trait that has the same sign and is significant at the 0.10 level for both genders is Responsibility: more Responsible individuals are more likely to be near the top. The effect is almost 50% stronger for women than for men. Of course, I am assuming causality: it is equally plausible that those who are near the top are perceived as being responsible because they

⁷¹ In sub-sample regressions, I found that Business majors and those whose supervisor studied at the same university may derive positive monetary benefits from working well in teams. Using indirect measures of teamwork such as participation in athletics and other student groups, or current membership in civil

have more responsibility. It is difficult to separate cause and effect, but it is not unreasonable to believe that Responsibility contributes to promotion within a company.

Table 4.19. Determinants of Place in the Corporate Ladder

	Men		Women	
	Coefficient	p-value	Coefficient	p-value
Experience	.3568	0.362	.3626	0.574
Experience ²	.0049	0.199	-.0016	0.797
Grad. year	.5208	0.189	.3699	0.566
GPA	.0335	0.162	.0318	0.359
Master's degree	.6249	0.462	1.4443	0.305
Ph.D.	.7537	0.555	-2.7566	0.175
Business	-.9689	0.174	-.8550	0.102
Engineering	-.3740	0.556	-.8820	0.139
Entrepreneur	-.2977	0.383	.3310	0.530
Self-assessed personality traits				
Open-minded	-.4488	0.042	.5160	0.041
High standards	.1407	0.646	-.3806	0.432
Creative	-.2097	0.304	-.3798	0.092
Hard Worker	.1389	**	.0658	0.853
Visionary	-.0891	0.665	.3268	0.161
Risk-taker	.1175	0.506	-.4993	0.008
Flexible	.4752	**	.0539	0.773
Responsible	-.0827	0.821	.0563	0.895
Teamwork	-.1381	0.505	.5460	0.014
Loyal	-.1531	0.582	-.0883	0.837
Seeks Advancement	.0248	0.913	.1532	0.581
Boss-assessed personality traits				
Open-minded	.0256	0.932	-.1930	0.547
High standards	-.1907	0.531	-.7570	0.087
Creative	.1529	0.564	.0567	0.857
Hard Worker	-.7232	0.004	-.1096	0.829
Visionary	-.2526	0.187	-.0820	0.765
Risk-taker	.2321	0.257	-.1368	0.584
Flexible	-.4045	0.043	-.1780	0.396
Responsible	.6657	0.052	.9205	0.091
Teamwork	-.0336	0.878	-.3409	0.437
Loyal	-.0346	0.891	.4215	0.208
Seeks Advancement	.1082	0.637	.1809	0.391
Constant	-43.3191	0.238	-30.5898	0.604
N	144		82	
Adj. R ²	0.3694		0.4853	
Ramsey	0.7708		0.9522	

Notes: regressions run with robust variance. Job title dummies included in controls. Dependent variable is the natural logarithm of income. * can reject the hypothesis that the self-assessed and supervisor-assessed coefficients are the same at the 10% level. ** can reject the hypothesis that the self-assessed and supervisor-assessed coefficients are the same at the 5% level.

associations, I found that this type of social activity is associated with lower compensation, in contrast to studies of US data (Bartlett and Miller, 1985; Duncan and Dunifon, 1998; Mueser, 1977).

For men, self-assessed Flexibility contributes to promotion, while boss-assessed Flexibility has the opposite effect, of nearly the same size. So of men with the same self-assessment for this trait, an improvement in the supervisor's view of the employee is associated with being at a lower place in the firm. Again, this may be a result of the demands of a given position. Self-assessed Open-Mindedness and boss-assessed Hard Worker also detract from promotion probabilities.

For women, self-assessed Open-Mindedness and Teamwork are associated with promotion, while self-assessed Creativity and Risk-Taking and boss-assessed high standards have the opposite effect. Note that self-assessed Open-Mindedness has the opposite effect for men and women. Several other traits also have opposite-signed coefficients, but those coefficients are statistically insignificant.

Interestingly, the Machiavellian trait "Advancement Seeking" has an insignificant, albeit positive, effect on promotion. Since its effect was also insignificant for compensation, either this sample is simply too small to get significant results, or it differs from samples used for studies of personality in the United States.

4.5.5 A brief word on personality and gender

Several of the economic studies that take personality into account are concerned with gender issues (Bartlett and Miller, 1985; Daymont and Andrisani, 1984; Filer, 1983; Vella, 1994). These studies generally address two questions: Does the exclusion of personality traits bias estimates? Are men and women rewarded differentially for certain traits? To a certain extent, the latter question has been answered above. Here, I focus on the first question and summarize findings related to the second.

For men, when personality traits are included in the boss-reported compensation regression (Table 4.2 vs. Table 4.15), all three significant coefficients in Table 4.2 become more positive in Table 4.15. Comparing the self-reported compensation regressions for women from Tables 4.2 and 4.16, not only does the latter explain compensation better, but the coefficients on several of the controls are higher.

As demonstrated in the previous section, promotions of men and women are influenced differently by the various personality traits. In addition, the effect of personality on within-occupation earnings seems to depend on gender. These findings may be related to the fact that men's and women's assessments differ, or may reveal that distinct personality traits are rewarded according to the employee's gender.

4.6 Conclusions

In this essay, I have attempted to contribute to the debate over the importance of personality in earnings and promotion. I have demonstrated that self-assessments and supervisor assessments of personality traits differ and, therefore, may yield distinct estimates of the marginal impact of certain traits on compensation and promotion. In some cases, even the sign of the coefficient differs from one assessment to another. It is not, however, a question of choosing one or the other: each evaluation gives us a valuable piece of information, one concerning inner drives, the other regarding how employers value these characteristics in their employees. More surveys with both measures of personality are needed, in order to identify more accurately how each contributes to earnings.

This is the first exploration of personality and earnings in Mexico. For my sample—employed (not self-employed) graduates from a single university over a twenty-year period—I find that personality has very little impact on compensation. There is, in fact, stronger evidence that certain personality traits are associated with promotions. Men who see themselves as Flexible or whose supervisors rate them as Responsible are more likely to be higher in the corporate ladder, while those who see themselves as Open-minded or who are viewed by their bosses as Hard Working or Flexible are less likely to do so. Women who see themselves as Open-minded or good at working in Teams, or whose bosses view them as Responsible are more likely to rise, while those who perceive themselves as Creative or Risk-takers, or who are seen by their bosses as having High Standards, are less likely to do so.

These findings are by no means definitive. The sample is small and not representative of the Mexican population, or even of Mexican professionals. Due to the small sample size, it was not possible to examine job-specific rewards for given personality traits. Furthermore, certain key variables, such as marital status and social background, are missing from this data. Therefore, while unique, it is not the ideal set of data for examining wage differentials.

There are many possible extensions of this study. Using the same database, potential supervisor biases can be examined. Although job-specific estimation is impossible, there are large sub-samples of engineering graduates and business-related majors, for whom different personality traits may be valued. It is possible that self-assessed traits suffer a reporting bias of the type tested by Elliot and Sandy (1998) for

disamenities; it would be interesting to test, for example, whether those who earn less than they should for their human capital rate themselves higher on certain traits.

Focusing on self-assessed traits only, the self-employed could be compared to those employed by others: are there important differences in their personalities, or in the way that traits influence earnings for each group? The contribution of self-assessed traits to occupational status can also be examined. Some parental data are included, but there is little overlap with the supervisor data, limiting possible venues to self-assessed personality traits if parental income, for example, were included in estimation.

By generating new survey data, more possibilities could be made available. In particular, it would be illuminating to place personality in an institutional context: if different traits are rewarded across countries, are these linked to societal values? Distinct relationships between work ethic and earnings across countries (e.g., Mexico vs. the United States) may be related to institutions in the way that Slemrod and Katuscak (2002) find trustworthiness is. It would be interesting to link these payoffs to social attitudes through a broader survey.

Chapter 5

Conclusion

Each of the three essays contained in this dissertation examines an aspect of the labor market that had been ignored previously. The first two consider study abroad and its effects on employment and earnings for college graduates; the third compares self-assessments and boss-assessments of employee personality traits. In addition, the first essay contains the first set of estimates of the employment hazard rates for Mexican college graduates, while the last essay is the first study of personality and earnings in Mexico.

5.1 Summary

The first essay, Chapter 2, explores the impact of college grades, participation in extracurricular activities, and study abroad in the transition from college to work. For this analysis, a survey applied six months after graduation to three consecutive graduating classes is employed. Parents and teachers encourage college students to maintain high grades and to participate in non-academic activities and study abroad programs in order to develop a competitive resume. The purpose of this essay was to test the assertion made by parents and teachers. I find that participation in extracurricular activities is associated with a higher employment hazard (and lower wage), while study abroad reduces the marginal probability of being hired at any given time (but study abroad participants enjoy higher wages and, on average, are hired sooner than those who do not study abroad). College grades are a significant positive factor in women's hazard rates, but not in men's.

The second essay focuses on the importance of study abroad in determining long-term earnings. Mexico began to globalize in 1985. Arguably, the demand for international skills should have been rising since then, but the supply of these skills has also increased. Study abroad offers an opportunity to increase one's earnings, as long as the demand for related skills exceeds supply. No previous studies have examined the economics of study abroad at the microeconomic level. I find that mastery of English contributes to higher long-term earnings in Mexico's three largest cities, but not in the rest of Mexico. Even when controlling for language skills, having studied abroad contributes significantly to income, but this effect diminishes with experience, indicating that the acquired skills or knowledge either become obsolete or are forgotten. Study abroad at the college and graduate levels contributes to higher earnings; again, the effect is reduced with experience; and ability is at least a weak complement to study abroad at these levels. The complementarity of grades and study abroad justifies the use of ability or grades as a factor in the awarding of scholarships for study abroad.

The final essay, Chapter 4, takes advantage of a unique survey applied to employees and their supervisors, in which both evaluated eleven aspects of the employee's personality. This is the first personality study to include and compare both employer and employee evaluations of the same traits, for any country. It is also the first analysis of personality and earnings in Mexico. While most of the traits had very little impact on earnings (when controlling for job title), responsibility is strongly associated with promotion. Self-assessments and employer evaluations differ and have differing impacts on both earnings and promotion.

5.2 Limitations and extensions

This study has several limitations. The first and most important is the data itself. Not only are the sample sizes small, but also the survey methods used were not well documented, calling into question the representativeness of the sample. Second, because the data are from a single university, it is difficult to know to what extent the results might apply to other Mexican college graduates. Third, as college graduates represent only 12% of the Mexican population, the results may not apply to the large majority of Mexicans: study abroad, for example, may be worth more or less for Mexicans with only a high school education. Finally, certain self-selection issues are beyond the scope of this study. In particular, Mexican emigrants are excluded from the analysis. If study abroad or certain personality traits contribute to emigration, then the returns to these characteristics may be different for broader portions of the population.

There are many ways to extend this study. The data are very rich and would allow other studies both related and unrelated to this one, despite the small sample sizes. The best way to pursue these topics, however, would be through the development of new databases. The easiest approach is to add questions about study abroad to existing labor market surveys. With more observations, it would be possible to examine the effects of studying in specific countries. For personality questions, entire surveys of employees and employers would need to be designed and implemented; ideally, several thousand observations would be acquired from many firms. While this is a large undertaking, it is well worth the effort. Finally, studies of the same factors in other countries are needed in order to make cross-country comparisons. Worker characteristics that are remunerated in Mexico may not be in the United States or Europe, for example, and vice versa.

5.3 Final remarks

While the results in this dissertation are informative, they have no predictive power. Not all students who go abroad earn more or are hired faster: many factors, observable and unobservable, influence earnings and employment. Certain personality traits may be associated with higher pay for some positions, but not others. Even the apparent complementarity of ability and study abroad is a mere pattern, not a guarantee.

At the same time, the benefits of study abroad, participation in extracurricular activities, or certain personality traits go beyond earnings and employment outcomes. Study abroad and participation in extracurricular activities can be considered consumption as well as investment, contributing directly to utility. Responsibility or a commitment to excellence in one's work contribute to satisfaction, which is more difficult to measure but no less important than income. Students, therefore, should view this study as an interesting intellectual exercise, not as a prescription.

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