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Does Overeducation Imply Poor Schooling Quality For Mexican American Men?

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Center for Regional Studies #101
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DOES OVEREDUCATION IMPLY POOR SCHOOLING QUALITY FOR MEXICAN AMERICAN MEN?

Abstract

This paper attempts to reconcile a contradiction in the economics of education research. On the one hand, research suggests that Americans, particularly Mexican Americans, are overeducated, and consequently earn lower returns to education than "adequately" educated peers. On the other hand, Mexican Americans have been well documented to receive lower education levels than non-Hispanic whites.

To explain this research inconsistency, the earnings function used by Verdugo and Verdugo (1988) is examined to discover if the purported overeducation earnings penalty results from an empirical model misspecification. In addition, the relationship between education quality and earnings is examined for Mexican Americans, blacks, and non-Hispanic whites. Finally, Sicherman's (1991) hypothesis of an inverse relationship between education quality and overeducation is tested to shed light on the incidence of overeducation. Education quality is proxied by state pupil-per-teacher ratios and expenditures-per-student ratios. All empirical tests are conducted using a 5 percent sample from the 1980 census "A" of the Public-Use Microdata.

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DOES OVEREDUCATION IMPLY POOR SCHOOLING QUALITY FOR MEXICAN AMERICAN MEN?

1. Introduction

Concern has escalated in recent times over the levels of education attained by members of the United States' workforce. One line of research finds that some Americans over-invest in education, and that these overeducated[1] workers earn less than their "adequately" educated peers. (Kalleberg and Sorensen, 1973; Burris, 1983; Tsang and Levin, 1985; Verdugo and Verdugo, 1988, 1989; Tsang, et al., 1991, Rumberger, 1987, 1981a, 1981b). Furthermore, this research finds that minority workers (Burris, 1983; Rumberger, 1981b), particularly Mexican Americans (Verdugo and Verdugo, 1988), have relatively high overeducation earnings penalties.

Ironically, Mexican Americans and blacks have been well documented to receive lower education levels than non-Hispanic whites (e.g., Reimers, 1983; Chiswick, 1988; Bean and Tienda, 1987; National Science Foundation, 1990; National Center for Education Statistics, 1987a, various issues). These findings suggest that minorities earn less than non-Hispanic whites because these groups are <u>undereducated</u>.

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[1]Workers considered to be overeducated are defined by Verdugo and Verdugo (1988) as those workers with education greater than one standard deviation above the occupational education mean.

The primary purpose of this study is to critically assess the apparent contradiction between these two research strands. Most of the inconsistency hedges on the work of Verdugo and Verdugo (1988) (henceforth V-V); hence, my first assessment step includes an evaluation of V-V's (1988) overeducation empirical model. That is, I attempt to determine whether V-V's overeducation findings result from a misspecification of their earnings function.

The next step of my assessment is to determine if the overeducation penalty inversely relates to education quality. The purpose of this step is two-fold. First, the aforementioned misspecification of V-V's empirical model may not fully explain the overeducation earnings penalty. In particular, Sicherman (1991) has recently suggested that the quantity of education is not the key to the alleged overeducation penalty. Sicherman hypothesizes that education quality partly explains the overeducation earnings penalty. That is, workers compensate for schooling-quality deficiencies through relatively higher levels of education. Is the purported overeducation penalty of Mexican Americans actually an education-quality penalty?

Second, the issue of the relationship between education quality and the earnings of Mexican Americans has been largely ignored in the social-science literature.[2]

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[2]I am aware of only three studies (Hanushek, 1971; Dávila, 1991b; Rivera-Batiz, 1991) which have studied the relationship between education quality and earnings for Mexican Americans.

Empirical research has found a positive correlation between the quality of education and earnings for non-Hispanic whites (e.g., Johnson and Stafford, 1973; Behrman and Birdsall, 1983; Card and Krueger, 1992a, 1992b; Chiswick, 1988; Welch, 1966, 1973; Dávila, 1991b). Furthermore, Welch (1973) and Card and Krueger (1992b) have found that an increase in the education quality for blacks partially reduced the black/white earnings differential over time. This study attempts to observe whether a regional education quality differential exists for Mexican Americans.

This report proceeds as follows. In Chapter 2, an account of the recent educational experience of Mexican Americans is presented. Chapter 3 discusses Becker and Chiswick's (1966) optimal schooling model to conceptualize the relationship between schooling quality and earnings. Chapter 4 presents the empirical models used to test the hypotheses of this thesis. Finally, Chapter 5 presents the results from estimating these models.

2. Mexican American Education Background

A perusal of education statistics reveals that Mexican Americans consistently attain lower education levels and score lower on aptitude exams than non-Hispanic whites. Table 1, which displays the mean education years for Mexican Americans and non-Hispanic whites, illustrates the education attainment differential. Although Mexican Americans increased their schooling attainment between 1970 and 1980, they continued to acquire less education than non-Hispanic whites.

Table 1: Mean Educational Attainment by Ethnicity

	Mexican American	Non-Hispanic White
1970	8.2	12.0
1980	9.1	12.0

Source: Hispanic Population of the United States, Table 8.1 (Bean and Tienda, 1987).

More recent education estimates show that the schooling gap between Hispanics and non-Hispanic whites has continued to decrease.[3] In 1987, Hispanics received an average of 12.0 schooling years, while non-Hispanic whites received 12.7 years (Rivera-Batiz, 1991). The following discussion

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[3]The reader is cautioned that information presented for Hispanics may not necessarily be the same for Mexican Americans. However, Mexican Americans represented almost two-thirds of the Hispanic population during the 1980's (U.S. Bureau of Labor Statistics, 1990), and are the fastest growing ethnic group (Cattan, 1988). Therefore, many of the education trends observed for Hispanics can be reflective of the trends of Mexican Americans as well. Unfortunately, many data are not broken down to include the Hispanic subgroups.

elaborates on some of the contributing factors of the Mexican American/non-Hispanic white schooling gap.

In particular, the relatively high Mexican American dropout rate offers one explanation for the education gap between Mexican Americans and non-Hispanic whites. Table 2 displays the percentage of Hispanic and non-Hispanic high school dropouts in 1980 and 1989. The 1990 Hispanic dropout rate is about 2.7 times higher than the non-Hispanic dropout rate. It follows that the large proportion of Hispanic dropouts decreases the likelihood for members of this group to enter post-secondary institutions.

Table 2: Percentage of High School Dropouts* by Ethnicity among People 14 to 34 Years Old for Selected Years

	Hispanic	Non-Hispanic White	Black
October 1972	34.3	13.2	21.5
October 1980	35.2	13.3	19.3
October 1990	32.4	12.0	13.2

* Dropouts are those people not enrolled in school and not high school graduates. Those who received their GED are counted as graduates.
Source: Digest of Education Statistics 1991 (National Center for Education Statistics), Table 98.

Table 3 displays enrollment rates of Hispanics for two-year and four-year post-secondary educational institutions, and provides further evidence of low education attainment of Hispanics and non-Hispanic whites. Notice that the percentage of Hispanics enrolled in four-year institutions is less than their percentage of the total population.

Table 3: Fall 1988 Hispanic Enrollment in Institutions of Higher Education[a], Fall 1988

Institution	Total Enrollment (Thousands)	Hispanic Enrollment (Thousands)	% Hispanics Enrolled	% Hispanic of Total Population
4-Year	8,175.0	296.0	3.62	7.22
2-Year	4,868.1	383.9	7.89	7.22

a Includes both private and public institutions.
Source: Digest of Education Statistics 1990, Table 190, (National Center for Education Statistics), and Handbook of Labor Statistics 1989 (U.S. Department of Labor).

Although Table 3 shows that Hispanics are not as likely to enroll in four-year institutions, the two-year institution enrollment rate reveals an improvement in their education trends since the 1970's. During that time, the percentage of degrees earned by Hispanics was disproportionately lower at all levels of education than their percentage of the total population (de los Santos, et al., 1983).

Table 4 complements the information presented in Table 3; Hispanics generally receive higher-level degrees at a lower rate than non-Hispanic whites. By 1986, only 12 percent of the 1972 Hispanic cohort received a Bachelor's degree or higher 14 years after graduation from high school, compared to 28 percent of the non-Hispanic white population.

Some researchers argue the relatively low post-secondary degree attainment rate of Hispanics is largely due to this group's lack of financial resources (Nora, 1990; López, et al., 1976; Haro, 1983). Hispanic students are less likely than all other college freshmen to rely on

Table 4: Educational Status of 1972 High School Graduates in Spring 1986 by Ethnicity

Highest Degree Awarded	Percent of Hispanics[a]	Percent of Non-Hispanic Whites[a]
High School Diploma	42	32
Some Post-secondary Education	35	29
1- or 2-Year Degree	12	12
Bachelor's Degree	8	20
Advanced Degree	4	8

a The column may not add up to 100% due to rounding.
Source: Digest of Education Statistics 1990 (National Center for Education Statistics, Table 343).

relatives or savings to finance their college education (National Science Foundation, 1990). Ironically, the overeducation literature proposes to increase private education costs (Tsang and Levin, 1985) in order to "correct" the overeducation earnings penalty. One possible implication of this policy recommendation, given the evidence presented so far, is an increase in the education differential between Hispanics and non-Hispanic whites.

The education quality differential between Hispanics and non-Hispanic whites provides further insights into the education experience of Hispanics in general and Mexican Americans in particular. For example, Mexican Americans have lower average aptitude exam scores than non-Hispanic whites.[4] Some of these exams include the Scholastic Achievement Test (SAT), the Advanced Placement (AP), the Item Response Theory (IRT), the National Education Longitudinal Study (NELS), and the Armed Forces Qualification Test (AFQT) (National Center for Education Statistics, 1991, 1991a, 1987a; National Science Foundation, 1990; Marine Corps Manpower and Reserve Affairs, 1991).

To illustrate, Tables 5 and 6 display the results for the SAT and the AP, respectively. These exams are generally

Table 5: SAT Scores for Mexican Americans and Non-Hispanic Whites for Selected Years

	Total (1)	Mexican American (2)	Non-Hisp White (3)	(3) - (2) Difference (4)
Verbal				
1976-77	429	370	448	78
1979-80	424	372	442	70
1986-87	430	379	447	68
1989-90	424	380	442	62
Math				
1976-77	470	408	489	81
1979-80	466	413	482	69
1986-87	476	424	489	65
1989-90	476	429	491	62

Note: Possible scores on each part of SAT range from 200 to 800.
Source: Digest of Education Statistics 1991 (National Center for Education Statistics), Table 124.

[4]Grade point averages are also thought to reflect education quality. Haro (1983) shows that the grade point averages in schools primarily composed of Hispanic and black students are, on average, less than predominately non-Hispanic white schools. However, he does not elaborate on whether or not the lower averages are mainly a black or Hispanic effect.

taken by high school seniors who plan to attend college. Although the SAT score differential in Table 5 has decreased over time, Mexican Americans continue to score, on average, lower than non-Hispanic whites.

The Advanced Placement (AP) exam in Table 6 presents a similar scenario. College credits are granted on the basis of student performance on this exam. The scores on the AP range from 1 (no recommendation) to 5 (highest recommendation). Note that Mexican Americans are less likely to test out of college courses using the AP exam.

Table 6: 1988 Advanced Placement Exam Scores for Mexican Americans and Non-Hispanic Whites

	Average	Mexican American	Non-Hispanic White
Biology	3.05	2.31	3.04
Chemistry	2.94	2.42	2.94
Physics B	2.85	2.10	2.85
Mathematics/ Calculus AB	3.10	2.67	3.11
Mathematics/ Calculus BC	3.53	2.59	3.50
Computer Science AB	2.56	2.13	2.64

Source: Women and Minorities in Science and Engineering 1990 (National Science Foundation).

An implication of the foregoing quality-of-education discussion is that the lower aptitude exam scores serve to reduce the enrollment eligibility of Mexican Americans for higher education institutions, which therefore directs them into lower level institutions. Indeed, because of the discrepancy of scores between non-Hispanic whites and Mexican Americans, some have argued (e.g., Haro, 1983) that the utilization of such exams as an admission criterion serves to intensify segregation in post-secondary schools.[5]

In sum, education statistics show that Mexican Americans have relatively lower levels of both education quantity and quality than non-Hispanic whites. Therefore, when Tsang and Levin (1985) suggest that "individuals will have to reconsider their investment in education" and "the government will have to re-examine its policy regarding public subsidy to education" (p. 94), the question arises as to whether or not minorities, especially Mexican Americans, are likely to be adversely affected by such policy recommendations.

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[5]In addition, Mullins suggests that the government has disregarded its duty of providing equal opportunity for education by segregating schools in terms of economic and social resources (Committee on Labor and Human Resources, 1983, p. 24-25).

3. Conceptual Issues

Although various schools of thought can be used to analyze the link between education and earnings, I examine education quality and overeducation through a human capital approach. Other views include Spence's (1973) screening model, Thurow's (1975) job competition model, and the Marxian model.[6]

Human capital theory operates in a parallel fashion to the neoclassical view of physical capital. Similar to firms investing in new machinery to upgrade their holdings, people invest in human capital to upgrade their desirability in the labor market. The investment decisions follow from the assumption that acquired levels of human capital positively correlate with earnings (e.g., Becker, 1962, 1964; Mincer, 1974, 1962; Weisbrod, 1962). Although human capital is

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[6]The job screening theory assumes that education signals the employer as to the relative productivity of the employee (Spence, 1973; Rumberger, 1981a). Overeducation, then, is a response by the worker to an increase in the educated workforce. The competition model assumes that workers are ranked according to personal attributes, including education, and this rank determines the potential job and earnings. Overeducation occurs when workers increase their education in response to an increase in the educated workforce just to maintain their rank (Thurow, 1975, 1974, 1972; Rumberger, 1981a). These two models are not relevant here because they explain overeducation in terms of changes in the workforce composition over time. In addition, this study uses cross-sectional data, while an analysis using the two aforementioned models requires longitudinal data. Marxism postulates that overeducation occurs among the upper class; this education is used by capitalists to control the working lower class by threatening to replace them with the upper class (Baran, 1957; Bowles and Gintis, 1976; Rumberger, 1981a). This view is not appropriate here because overeducation has been found to occur among the least educated workers (Rumberger, 1981b; Verdugo and Verdugo, 1988) and among workers of minority origin rather than non-Hispanic white (Burris, 1983).

traditionally composed of education, on-the-job training, and health, contemporary research has examined the effects of the family (e.g., Borjas, 1992; Hanushek, 1971, 1992; Chiswick, 1973) and peer and neighborhood effects (Lillard, 1990; McManus, 1990; Hanushek, 1971, 1992) on human capital acquisitions.

The equilibrium level of an individual's human capital attainment is determined where the marginal interest cost of acquiring human capital equals the marginal return to the investment, as put forth by Becker and Chiswick (1966). In terms of education, the equilibrium level of education occurs when the marginal interest cost of education equals the marginal rate of return to the investment.

According to the Becker-Chiswick optimal schooling model, the demand for education is a downward-sloping function because human capital eventually encounters a diminishing marginal product in a fixed human being. In addition, increased levels of human capital investment generally require a prolonged time period. Because humans have a finite lifetime, the number of productive years should be inversely related to the time spent in acquiring human capital.

The private marginal cost of funds rises with schooling investments because the cost of attaining education at low levels of schooling is small, due to government subsidization, parental gifts, low risk, and reduced consumption. At higher levels of education, the cost of schooling increases because the government subsidizes less, lending risks increase, and foregone consumption may be valued more by the individual.

Figure 1 displays the optimal schooling model. The demand for education by individual i is denoted by Di, which depicts the marginal rate of return on the schooling investment. The marginal cost of funds facing individual i is represented by MCi. The investor attains equilibrium when the marginal interest cost of funds equals the marginal return to the investment. Hence, the optimal return for i is R* and the optimal level of education is E*.

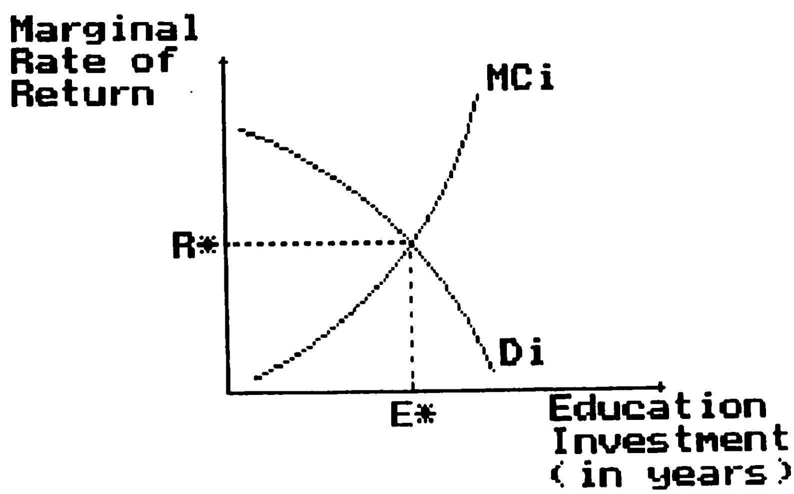

Figure 1: The Optimal Schooling Model

The optimal schooling theory allows for the possibility that individuals face different marginal cost schedules, due to the availability of funds from parents, scholarships, and opportunity costs. Also, every individual has different demand schedules because of personal characteristics including life longevity, human capital absorption, ability, and attitudes toward risk. Therefore, the optimal level of schooling varies widely among the population.[7]

The Becker-Chiswick optimal schooling model can be used to conceptualize the relationship between quality of education and labor-market earnings. An abundance of studies have examined the relationship between human capital quality and earnings (e.g., Johnson and Stafford, 1973; Behrman and Birdsall, 1983; Card and Krueger, 1992a, 1992b; Hanushek, 1971, 1991, 1992; Chiswick, 1988; James, et al., 1989; Welch, 1966, 1973; Dávila, 1991b).

Consider two individuals, j and k, who are alike in ability and socioeconomic situations. Let j receive an average education quality level, and k receive a below-average education quality level. Figure 2 shows j's and k's corresponding education-demand functions, Dj and Dk, along with j's and k's equilibrium rates of return, Rj and Rk. Notice that k receives a lower marginal rate of return and invests in less education than j.

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[7]For more discussion on the optimal schooling model, see Becker (1967), and Chiswick (1988).

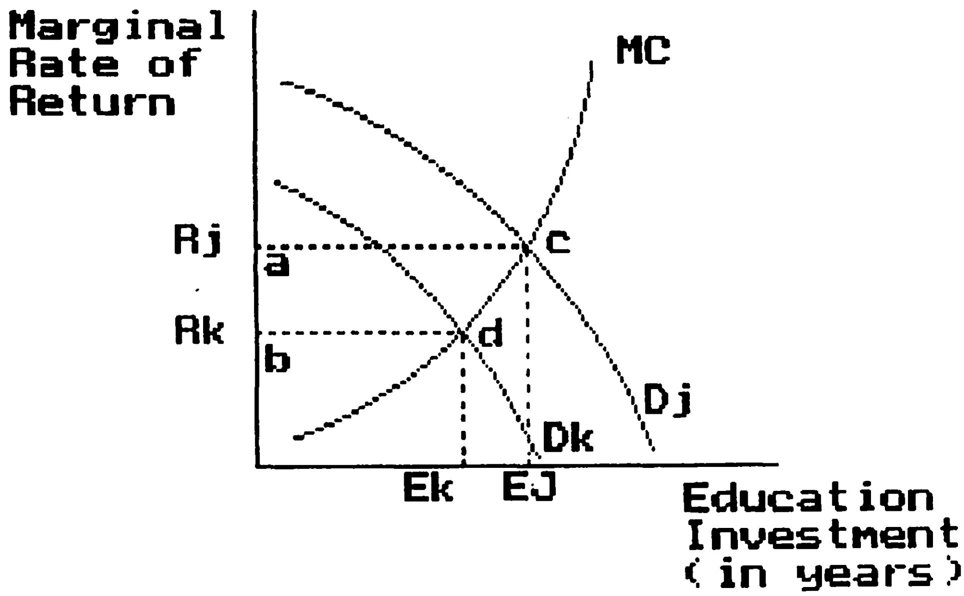

Figure 2: The Optimal Schooling Model and Education Quality

Chiswick (1988) proposes that an increase in education quality should yield an increase in both the rate of return and the quantity of schooling, assuming that the marginal cost is neither perfectly inelastic nor perfectly elastic.[8] Mattila (1982) has found that a higher expected rate of return on schooling investments leads to an increase in educational attainment. These scholars' observations are consistent with those of the optimal schooling model. That

[8]A further assumption must be made that an increase in education quality will not increase private costs.

is, as the quality of education increases, both the returns to schooling and the education attainment of individuals increase, ceteris paribus.

To conclude, the link between overeducation and the optimal schooling should be made. Recall that Sicherman (1991) hypothesizes an inverse relationship between overeducation and education quality. If such a relationship exists, the Dk curve could represent the returns to education for the overeducated minority worker. For example, let k receive education quality that is 20 percent less than j's so that k's education quality measure is 1 and j's is 1.2. Further assume that S^* denotes a level of schooling such that $S^* = S \cdot Q$, where S is the actual number of school years completed and Q is the level of quality. At $S^*=12$, k will need to complete 12 years of school, while j only needs 10 years. k would then appear "overeducated", but k needs more schooling than j to be equally valued in the labor market.

4. Data and Empirical Models

To test the hypotheses of this thesis, the following measures and data sets are used. An overeducation measure and education quality data are integrated into the 1980 census "A" of the Public-Use Microdata (PUMS). The census information used in this analysis includes Mexican American, non-Hispanic white, and non-Hispanic black male United States citizens aged eighteen or older.

To test for the significance of overeducation and education quality and overeducation, I use a Mincer (1974) earnings function. Without incorporating the measures of education quality and overeducation, an earnings function for individual i can be constructed as

$$\ln(EARN_i) = \beta_0+\beta_1 EXP_i+\beta_2 EXP_i^2+\beta_3 WORK79_i + \beta_4 GRADE_i+\beta_5 MARRIED_i+\epsilon \qquad (1),$$

where $\ln(EARN_i)$ is the natural logarithm of i's earnings and ϵ is the error term. EXP_i and EXP^2_i stand for i's job experience and job experience squared. Because the PUMS does not provide a direct measure of on-the-job training, EXP is constructed by using age - education - 5. The quadratic form of experience stems from the assumption that investments in on-the-job training decrease with other factors, such as age and human capital depreciation.[9]

[9]Although the non-linearity of job experience has not been disputed, the quadratic form has recently been challenged by Murphy and Welch (1990). They suggest the use of a cubic or quartic

WORK79$_i$ denotes the number of hours worked by i in 1979. This variable is important because the PUMS provides earnings information rather than wages. Average annual hours are entered into the function to control for earnings differentials resulting from variations in work hours. **GRADE**$_i$ is i's number of schooling years, and **MARRIED**$_i$ is a dummy variable for the marital status of i, which may account for unmeasurables such as labor-market stability. Table 7 summarizes the variable definitions used for all of the empirical analyses.

Table 7: Definitions of Variables

Variable	Definition
LN(PPT)	Natural Logarithm of Pupil per Teacher Ratio
LN(EPS)	Natural Logarithm of Expenditures per Student
OE	OE = 1 if Schooling > 1 σ above Education Mean; 0 Otherwise
EXP	Work Experience (Age - Education - 5)
EXP^2	Work Experience Squared
WORK79	Number of Hours Worked in 1979
GRADE	Number of School Years
MARRIED	Married = 1; 0 Otherwise
SW	SW = 1 if living in Southwest; 0 Otherwise
NSW	NSW = 1 if not living in Southwest; 0 Otherwise

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experience term to decrease some of the systematic biases that exist with the use of the quadratic experience term. For this study, however, only $\mathbf{EXP^2}$ is included to preserve Mincer's (1974) original function; Mincer states the relationship between earnings and experience is **ln(EARN) = f(experience, experience squared)**.

In order to investigate the influence of overeducation on individual i's earnings, a dummy variable, **OE**$_i$, will be introduced into Equation 1. The construction of **OE** is based on V-V's (1988, 1989) overeducation variable: **OE** = 1 if an individual's education is in excess of one standard deviation above the individual's occupation educational mean; **OE** = 0, otherwise.

It must be noted, though, **OE** has sufficient variability because of its relativity. V-V assume that an individual may be considered overeducated in one occupation but not in another, which is not unrealistic. This study goes beyond V-V's assumption because overeducation may also be relative to an individual's own sex-ethnic group. Hence, the mean schooling of over 500 occupations is estimated for Mexican Americans, non-Hispanic whites, and blacks. Dávila (1991a) demonstrates how the absolute value of the overeducation earnings penalty decreases for non-Hispanic white men when comparing this group against itself.

I use the V-V measure rather than surveys and interviews used by Tsang, et al., (1991), Rumberger (1987), Burris (1983), and Kalleberg and Sorensen (1973) because the V-V measure does not rely on respondents' subjectivity when discussing overeducation. Some of the surveys include the 1977-78 National Opinion Research Center survey, Quality of Working Life surveys, and Quality of Employment surveys.

Although my construction of **OE** stems from V-V (1988), I do not use their immigration status, as it incorporates other aspects such as family effects (see Borjas, 1992). Also, depending on the time of immigration, it is likely that the immigrants did not receive all of their education in the United States. In addition, I delete V-V's (1988) regional variables, unemployment rate, and the employment sector because I want to preserve the original specification of Mincer's (1974) earnings function as much as possible. However, I retain the **MARRIED** variable to account for some social effects such as labor force attachment, although it was not originally specified by Mincer.

Finally, it has been demonstrated by Dávila (1991a) that V-V's (1989) omission of $\mathbf{EXP^2}$ resulted in an overstatement of the overeducation earnings penalty for non-Hispanic whites. V-V also delete $\mathbf{EXP^2}$ in their (1988) study which reported that Mexican Americans suffer from the highest overeducation penalty.

In order to determine whether their finding of the high overeducation penalty for Mexican Americans resulted from a model misspecification, two earnings functions are evaluated with the **OE** term: one without the $\mathbf{EXP^2}$ term, and one including the $\mathbf{EXP^2}$ term. Formally, these two functions can be constructed as

$$\ln(EARN_i) = \gamma_0+\gamma_1 EXP_i+\gamma_2 WORK79_i+\gamma_3 GRADE_i$$

$$+\gamma_4 MARRIED_i+\gamma_5 OE_i+\epsilon \qquad (2),$$

and

$$\ln(EARN_i) = \beta_0 + \beta_1 EXP_i + \beta_2 EXP_i^2 + \beta_3 WORK79_i$$

$$+\beta_4 GRADE_i + \beta_5 MARRIED_i + \beta_6 OE_i + \epsilon \qquad (3).$$

As noted in Chapter 1, if the overeducation penalty is found to result from V-V's earnings-function misspecification, it is still of interest to evaluate the impact of education quality on the earnings of Mexican Americans. For the evaluation, I examine quality measures by state for the school years 1959-60, 1969-70, and 1979-80. Specifically, I employ the pupil-per-teacher ratio (PPT) (utilized by Card and Krueger, 1992a, 1992b; Welch, 1966), and expenditures-per-student (EPS) (utilized by authors such as Johnson and Stafford (1973); Hanushek, 1971; Welch, 1966, 1973) to proxy for education quality.[10]

The education data for the years 1979-80 and 1969-70 come from various issues of the Digest of Education Statistics (National Center for Education Statistics), and the 1959-60 data are found in Hobson and Schloss' (1961) Statistics of State School Systems 1959-60. These measures

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[10]Although this study keeps the measure of PPT as used by Card and Krueger (1992a, 1992b), a more appealing measure would be teacher per pupil (TPP) so that it would move in the same direction as EPS.

are assigned a weighted average according to age,[11] and the EPS measures are further adjusted by state for cost-of-living differences using American Chamber of Commerce Research Association (ACCRA) data, and over time using the Consumer Price Index (CPI).

It must be noted that the assignments of PPT and EPS as proxies for education quality are not perfect. First, it is assumed that individuals received their education in states where they were employed in 1979. Although this does not provide a completely accurate scenario, it accounts for the migration of families after an individual's birth and before the individual goes to school. The PUMS does not supply a longitudinal analysis, which would be the most reflective account of the sampled individuals' education experiences.

Second, especially for EPS, only interstate variations are taken into account. Undoubtedly, intrastate and intra-city variations exist, and the omission of these more detailed measures may increase the error variance of EPS, and create a downward bias on the estimated coefficient (Johnson and Stafford, 1973). Also, the coefficient on the quantity of schooling may represent some of the intrastate variation, therefore having an upward bias on the estimated coefficient (Behrman and Birdsall, 1983). However, the limitations of this study only allow for interstate variations. Future research should incorporate intrastate

[11]See Dávila (1991b) for the specific weight assignments.

and intra-city variations to observe whether or not the results significantly change.

Finally, PPT and EPS do not capture other variables such as the family and peer effects on human capital acquisition (Behrman and Birdsall, 1983; Dávila, 1991b). Hanushek (1971) specifically states that in addition to the school inputs, an individual's educational output also depends on the individual's innate endowments, and peer and family influences.

In addition to PPT, Card and Krueger (1992a, 1992b) and Welch (1966, 1973) have used teacher salaries to measure education quality. Despite the potential flaws of EPS, I feel it provides a more reliable quality measure than teachers' salaries. This is so because the salary measure excludes other variables influencing schooling quality, and may be contaminated with other factors such as tenure, which may not reflect quality. The EPS measure includes teachers' salaries, as well as capital expenditures, learning materials, subsidized lunches (which reflect human capital investments in health), and a host of other variables.

I have opted not to include the length of school term [as used by Welch (1973) and Card and Krueger (1992a, 1992b)] mainly because the variation in required school days has narrowed over time. For instance, in 1990, the variation in required days for the continental United States was only 7 days (National Center for Education Statistics, 1991, Table 117). In addition, this variable does not capture the length of the school __day__ and absentee rates. In the simplest terms, if a student does not attend class, s/he will not learn as much as the class-attending students, regardless of the term length.

In order to analyze the significance of education quality, the natural logarithm of education quality is added to Equation 1:

$$\ln(EARN_i) = \beta_0 + \beta_1 EXP_i + \beta_2 EXP_i^2 + \beta_3 WORK79_{i_{\beta_4}} GRADE_i$$

$$+ \beta_5 MARRIED_i + \beta_6 \ln(QUALED_i) + \epsilon \qquad (4).$$

The use of **ln(QUALED)** allows the coefficient to measure the elasticity of wages with respect to education quality, as suggested by Johnson and Stafford (1973). Furthermore, the relationship between education quality and earnings is usually assumed non-linear (e.g., Welch, 1966; Behrman and Birdsall, 1983; Dávila, 1991b). The other variables are the same as in Equation 1.

Education quality can be formally represented by

$$QUALED_i = k \cdot PPT_i^{\alpha_1} \cdot EPS_i^{\alpha_2} \qquad (5),$$ [12]

and by taking the natural logarithm of both sides, education quality can be represented by

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[12]The use of a Cobb-Douglas education quality function was suggested by Welch (1966).

$$\ln(QUALED_i)=\alpha_0+\alpha_1\ln(PPT_i)+\alpha_2\ln(EPS_i)+\epsilon \quad (6),$$

which is of the proper form to be tested in Equation 4. The predicted sign of α_1 is negative because one would expect that as the ratio of students to teachers increases, the teacher has less time to spend with each individual student. The predicted sign of α_2 is positive due to the assumption that expenditures on capital structures, salaries, and so forth reflect a higher market value of the education.

One final observation for education quality is whether or not a quality differential exists between the Southwestern United States and the non-Southwestern United States. The specification of the Southwest stems from the fact that the majority of Mexican Americans live in the five Southwestern states: New Mexico, Texas, Arizona, Colorado, and California. Consequently, Equation 4 is estimated with two different sample restrictions: (1) the Southwest sample, **SW**, is used for workers living in the Southwest, and (2) the non-Southwest sample, **NSW**, is used for workers not living in the Southwest. This exercise attempts to capture regional differences in education quality.

Finally, Sicherman's (1991) hypothesis of an inverse relationship between education quality and overeducation will be tested. Equations 3 and 4 are entered into Equation 1 to form the following:

$$lnEARN_i = \beta_0 + \beta_1 EXP_i + \beta_2 EXP_i^2 + \beta_3 WORK79_i + \beta_4 GRADE_i + \beta_5 MARRIED_i$$
$$+ \beta_6 \ln(PPT_i) + \beta_7 \ln(EPS_i) + \beta_8 OE_i + \epsilon \qquad (7).$$

All of the β_n's have positive predicted signs except for β_2 β_6, and β_8. If the inclusion of the education quality variables reduces the coefficient of OE from its estimation in Equation 3, then the Sicherman hypothesis is supported.

5. Empirical Results

Table 8 displays the results from estimating the Mincer earnings function without including the education quality and overeducation variables. All of the coefficients of the independent variables are statistically significant and have the expected signs. See the appendix for the means and standard deviations of the independent variables.

Table 8: Results from Estimating Equation 1
Dependent Variable = LN(1979 Earnings)

Variable[a]	Mexican American	Non-Hispanic White	Black
Constant	6.724*	6.896*	6.581*
	(129.606)	(658.627)	(171.471)
EXP	0.046*	0.054*	0.043*
	(20.164)	(134.397)	(30.868)
EXP^2	- 0.00070*	- 0.00095*	- 0.00065*
	(- 15.463)	(-113.696)	(- 24.124)
WORK79	0.00055*	0.00051*	0.00055*
	(36.368)	(187.852)	(57.661)
GRADE	0.064*	0.061*	0.070*
	(21.851)	(105.908)	(31.283)
MARRIED	0.205*	0.231*	0.208*
	(8.885)	(55.816)	(15.413)
R^2	0.344	0.407	0.314
N	6,335	175,701	17,338

a See Table 7 for variable definitions.
* Significant at the 1 percent level.
NOTE: t-statistics are in parentheses.

Although the coefficient of the quantity of education, GRADE, is slightly higher for Mexican Americans and blacks than for whites, the difference is small. An increase in one year of schooling for Mexican Americans should increase their earnings by about 6.4 percent. Similarly, blacks and non-Hispanic whites could increase their earnings by 7 percent and 6.1 percent, respectively, by increasing their schooling attainment by one year.

In addition, the returns to on-the-job training, **EXP**, are higher for non-Hispanic whites and blacks. Because of the quadratic nature of the work experience term, the following transformation is used to evaluate the impact that this variable has on earnings:

$$\frac{\partial[\ln(EARN)]}{\partial(EXP)} = \beta_1 + 2\beta_2(EXP) \qquad (8).$$

Using the experience mean of 16.624 (see appendix) for Mexican Americans, their return to work experience is 100 x [0.046 - (2 x 0.0007 x 16.624)] = 2.27. Accordingly, using the experience means of 18.131 and 18.784, the returns to work experience for non-Hispanic whites and blacks are 1.96 and 1.86, respectively.

The hours worked in 1979 by each group have approximately the same coefficient, although it is slightly lower for non-Hispanic whites. Also, the **MARRIED** term is slightly higher for non-Hispanic whites.

5A: Overeducation and Earnings

Recall that the overeducation variable, **OE**, is tested in two specified earnings functions: Equation 2, which omits the quadratic experience variable, and Equation 3, which includes the quadratic experience variable. Table 9 presents the estimation results for both of these models.

Notice that the **OE** coefficient is <u>not</u> significant for Mexican Americans in **either** equation. This finding is inconsistent with that of V-V (1988), who find that not only do Mexican Americans suffer from overeducation, they suffer the highest penalty.[13] In addition, with the inclusion of the quadratic experience term, the **OE** coefficient decreases.

It is of interest to note that Dávila (1991a) replicated V-V's (1989) full model without using the experience squared term and found the overeducation penalty reported by V-V for non-Hispanic whites. Nevertheless, my result suggests that V-V's finding is not robust with respect to simpler models. In addition, I have provided a result including the experienced squared term which is more consistent with Mincer's original earnings-function formulation. I conclude from this analysis that V-V's (1988) findings of the overeducation earnings penalty for Mexican Americans may have potentially been biased. Moreover, the purported inconsistency noted at the outset of

[13]Other studies (Sicherman, 1991; Duncan and Hoffman, 1981; Hartog and Oosterbeek, 1988) have found positive and significant returns to education at all levels as well, although these studies do not examine Mexican Americans.

this thesis most likely results from a model misspecification in V-V's study.

For blacks, the omission of EXP^2 in Equation 2 yields a negative and significant overeducation penalty, similar to the finding by V-V (1988). However, the magnitude of the penalty decreases and becomes insignificant when EXP^2 is included in the model. It follows that the overeducation penalty experienced by blacks as reported by V-V (1988) is also possibly due to an empirical model misspecification.

Table 9: Estimation of Equations 2 and 3 with OE
Dependent Variable = LN(1979 Earnings)

Variable[a]	Mexican American γ^b	Mexican American β^c	Non-Hisp White γ^b	Non-Hisp White β^c	Black γ^b	Black β^c
Constant	6.728*	6.723*	6.751*	6.839*	6.501*	6.571*
	(124.534)	(126.728)	(592.809)	(620.217)	(158.672)	(162.554)
OE	- 0.050	- 0.003	- 0.123*	- 0.083*	- 0.079*	- 0.015
	(- 1.431)	(- 0.093)	(-23.165)	(- 16.176)	(- 3.711)	(- 0.725)
EXP	0.013*	0.046*	0.011*	0.054*	0.012*	0.043*
	(15.238)	(20.126)	(80.253)	(133.186)	(22.650)	(30.709)
EXP^2	---------	- 0.0007*	---------	- 0.0009*	---------	- 0.0007*
		(-15.393)		(-112.394)		(-23.838)
WORK79	0.0006*	0.0006*	0.0006*	0.0005*	0.0006*	0.0006*
	(39.058)	(36.357)	(215.412)	(187.251)	(62.517)	(57.651)
GRADE	0.069*	0.064*	0.075*	0.066*	0.0829*	0.071*
	(21.553)	(20.275)	(111.572)	(101.136)	(33.180)	(28.221)
MARRIED	0.292*	0.205*	0.342*	0.231*	0.269*	0.028*
	(12.819)	(8.883)	(82.478)	(55.815)	(19.960)	(15.415)
R^2	0.319	0.344	0.366	0.408	0.292	0.314
N	6,335	6,335	175,701	175,701	17,338	17,338

a See Table 7 for variable definitions.
b Estimated coefficients for Equation 2.
c Estimated coefficients for Equation 3.
* Significant at the 1 percent level.
NOTE: t-statistics are given in parentheses.

The coefficient on OE for non-Hispanic whites is negative and significant for both equations, suggesting that the overeducation penalty is a non-Hispanic white phenomenon. This challenges the view that overeducation generally occurs among minority groups (Burris, 1983; Rumberger, 1981b; V-V, 1988). It must be noted, though, that the magnitude of the penalty for whites falls when EXP^2 is entered in their earnings function.

In sum, according to the results presented here, Mexican Americans have not been over-investing in education, and the reported overeducation for blacks disappears with the inclusion of the quadratic experience term. Although these results may partially explain the apparent research inconsistency, it is still of interest to examine education quality, as well as test Sicherman's hypothesis because of the results for non-Hispanic whites.

5B: Education Quality and Earnings

Table 10 displays the estimation results for three specifications of Equation 4. First, Equation 4 is tested only using **LN(PPT)** as the education quality proxy. Recall that the predicted sign of **LN(PPT)** is negative, based on the conjecture that as the number of students per teacher increased, each teacher has less time to spend with individual students. The natural logarithm allows the coefficient to measure the elasticity of the **LN(PPT)** ratio with respect to earnings.

For blacks and non-Hispanic whites, the **LN(PPT)** coefficient is negative as expected, although it is not significant for non-Hispanic whites. Surprisingly, this variable is positive and significant for Mexican Americans. This contradicts one's expectations that as the number of students increases per teacher, the level of quality experienced by the student decreases.

The fluctuating sign on this variable suggests that other factors interfere with this measure. One possibility might be a regional effect. Blacks are highly concentrated in the Southeast United States, while Mexican Americans are primarily concentrated in the Southwest. Tables 12 and 13 provide a regional analysis via Equation 4 by distinguishing between workers living in the Southwest versus the non-Southwest. Future research should explore whether a vast differential in PPT exists between these regions.

Table 10: Estimation of Equation 4 Using LN(PPT) and LN(EPS)
Dependent Variable = LN(1979 Earnings)

Variable[a]	Mexican American[b]	Non-Hispanic White[b]	Black[b]	Mexican American[c]	Non-Hispanic White[c]	Black[c]	Mexican American[d]	Non-Hispanic White[d]	Black[d]
Constant	3.462*	6.950*	7.904*	4.817*	5.661*	4.783*	3.568*	5.274*	4.835*
	(7.796)	(111.004)	(33.599)	(19.072)	(127.379)	(32.829)	(8.031)	(62.052)	(13.567)
LN(PPT)	1.123*	- 0.018	- 0.442*	-----	-----	-----	0.652*	0.115*	- 0.014
	(7.397)	(- 0.865)	(- 5.702)				(3.416)	(5.348)	(- 0.159)
LN(EPS)	-----	-----	-----	0.250*	0.158*	0.239*	0.165*	0.165*	0.237*
				(7.714)	(28.580)	(12.787)	(4.053)	(29.065)	(11.435)
EXP	0.027*	0.055*	0.049*	0.043*	0.055*	0.044*	0.034*	0.054*	0.044*
	(8.217)	(105.672)	(27.591)	(19.042)	(136.668)	(31.783)	(9.165)	(103.753)	(24.115)
EXP^2	- 0.00048*	- 0.00096*	- 0.00073*	- 0.00067*	- 0.00097*	- 0.00067*	- 0.00056*	- 0.00094*	- 0.00067*
	(-8.838)	(-100.644)	(-24.073)	(-14.850)	(-115.604)	(-24.753)	(- 9.680)	(-99.544)	(-21.744)
WORK79	0.00055*	0.00051*	0.00055*	0.00055*	0.00051*	0.00055*	0.00055*	0.00051*	0.00055*
	(36.693)	(187.822)	(57.880)	(36.798)	(189.396)	(58.158)	(36.838)	(189.322)	(58.134)
GRADE	0.053*	0.061*	0.071*	0.060*	0.060*	0.065*	0.055*	0,059*	0.065*
	(16.360)	(103.283)	(31.730)	(20.389)	(103.221)	(28.964)	(16.805)	(98.576)	(28.482)
MARRIED	0.204*	0.231*	0.216*	0.220*	0.242*	0.225*	0.214*	0.241*	0.225*
	(8.888)	(55.744)	(15.923)	(9.539)	(58.414)	(12.787)	(9.286)	(58.087)	(16.668)
R^2	0.349	0.407	0.315	0.350	0.410	0.321	0.351	0.410	0.321
N	6,335	175,701	17,338	6,335	175,701	17,338	6,335	175,701	17,338

a See Table 7 for variable definitions.
b Equation 2 estimated using only LN(PPT).
c Equation 2 estimated using only LN(EPS).
d Equation 2 estimated using both LN(PPT) and LN(EPS).
* Significant at the 1 percent level.
NOTE: t statistics are in parentheses.

The second analysis is conducted using only **LN(EPS)** to proxy for education quality. This variable is positive and significant for all three ethnic groups, as expected. Although the face value of the **LN(EPS)** coefficients suggests that Mexican American and black earnings are much more sensitive to EPS than non-Hispanic white earnings, a closer examination is necessary to determine each group's internal rate of return to this variable.

The internal rates of return for Mexican Americans, non-Hispanic whites, and blacks suggest that the sensitivity to changes in EPS is relatively the same for these groups. For example, assume that society deems it beneficial to increase EPS by 10 percent. Given a 3 percent real rate of return on money, the internal rates of return for Mexican Americans, non-Hispanic whites, and blacks are 4.791 percent, 4.727 percent, and 5.116 percent, respectively.[14]

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[14]The internal rates of return are calculated as follows. Recall that the coefficient on **LN(EPS)** measures the elasticity of wages with respect to EPS. Therefore, the **LN(EPS)** coefficient of 0.250 = (% change in wages)/(% change in EPS). If the work life expectancy is 40 years, and assuming a 10 percent increase in EPS for 12 years, the first-grade Mexican American student should experience an annual change in wages of 0.250/0.10 = 2.5 percent for 40 years. According to the PUMS, the mean annual 1979 earnings of Mexican Americans is approximately $12,683.51, and their mean EPS is $2,591.52. The increase in wages due to the 10 percent increase in EPS, then, is 0.025 x $12,683.51 = $317.09 for 40 years. The annual cost to society would be 0.10 x $2,591.52 = $259.15 for 12 years. The present terminal value of the increase in wages = $W \times [(1 + k)^n - 1]/k$, where W is the yearly increase in wages, k is the interest rate, and n is the number of years for the investment (Campsey and Brigham, 1985). Assuming an interest rate of 3 percent, the present value of the increase in wages = $317.09 x $[(1 + 0.03)^{40} - 1]/0.03$ = $23,900. Likewise, the present value of the cost to society for the 12 year increase in EPS is $259.15

The similarity in the rates of return suggests that an increase in EPS will not exclusively benefit one particular ethnic group. In addition, because of the consistency in the coefficient signs of **LN(EPS)** across the ethnic groups, this variable is presumably a more reliable measure of education quality than the pupil-per-teacher ratio.

When both **LN(PPT)** and **LN(EPS)** are included together in Equation 4, **LN(PPT)** remains positive and significant for Mexican Americans. Interestingly, this variable becomes insignificant for blacks, and becomes positive and significant for non-Hispanic whites.

Card and Krueger (1992b) also find that their pupil per teacher coefficients change signs and significance levels for blacks and whites with the incorporation of the teachers' salary measure into their empirical model. The signs revert back to their original form when they include a region variable. See Table 12 for a similar result. The PPT variable should be used with caution when measuring education quality, as it captures other factors that influence earnings.

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x $[(1 + 0.03)^{12} - 1]/0.03$ = \$3,677.86. The internal rate of return (r) over the 40 year period is $r = [(R/I)^{1/40} - 1]$, where R is the total increase in wages, and I is the total cost to society (Campsey and Brigham, 1985). For Mexican Americans, $r = [(\$23,909/3,677.86)^{1/40} - 1] = 0.0479$, or 4.79 percent.

The same formulas are applied to non-Hispanic whites and blacks to calculate their internal rates of return of 4.727 percent and 5.116 percent. The mean 1979 annual wages are \$17,613.66 and \$12,440.915, and the mean EPS values are \$2,330.88 and \$2,147.74, for non-Hispanic whites and blacks, respectively.

The LN(EPS) coefficient remains positive and significant for all three groups. Again, this suggests that EPS is a more reliable measure of education quality than PPT. Hence, future studies examining education quality should emphasize the EPS variable rather than PPT. For the sake of completeness, though, both quality variables will be included when testing Sicherman's hypothesis.

To determine whether or not the effect of the change in signs for LN(PPT) is due to high collinearity of the variables, Table 11 presents the correlation matrix for the three groups.

Table 11: Correlation Matrix for Quality Variables

	Mexican American LN(PPT)	Mexican American LN(EPS)	Non-Hisp White LN(PPT)	Non-Hisp White LN(EPS)	Black LN(PPT)	Black LN(EPS)
LN(PPT)	1.000	0.421	1.000	-0.272	1.000	-0.420
LN(EPS)	0.421	1.000	-0.272	1.000	-0.420	1.000

These variables are correlated for both Mexican Americans and blacks by about 42 percent. The positive relationship between these variables for Mexican Americans explains the significant positive LN(PPT) coefficient. The variable correlation has the expected negative signs for blacks and non-Hispanic whites.

The different signs of correlation may be explained by regional factors. Mexican Americans are primarily concentrated in the Southwest. Table 12 provides a regional analysis using both Southwest and non-Southwest samples for

LN(PPT). All three ethnic groups in the Southwest sample have positive and significant coefficients for LN(PPT), while the coefficients for all three groups are negative for the non-Southwest sample.

This implies that Mexican Americans do not react differently than other students to educational quality inputs, primarily because the non-Hispanic white and black students living in the Southwest also experience the same phenomenon with respect to LN(PPT). The Southwest effect suggests that larger school districts in this region have an advantage over smaller school districts.

Table 12: Estimation of Equation 4 using SW and NSW for LN(PPT)
Dependent Variable = LN(1979 Earnings)

Variable[a]	Mexican American γ^b	Mexican American β^c	Non-Hisp White γ^b	Non-Hisp White β^c	Black γ^b	Black β^c
Constant	1.536*	8.579*	3.954*	7.648*	2.834*	8.763*
	(3.034)	(8.806)	(21.828)	(109.901)	(3.955)	(34.595)
LN(PPT)	1.782*	- 0.631***	0.981*	- 0.249*	1.272*	- 0.724*
	(10.293)	(- 1.742)	(16.098)	(-10.632)	(5.219)	(- 8.720)
EXP	0.015*	0.061*	0.040*	0.058*	0.026*	0.053*
	(4.349)	(6.423)	(31.889)	(99.805)	(5.178)	(27.217)
EXP^2	- 0.0003*	- 0.0009*	- 0.0007*	- 0.0010*	-0.0007*	- 0.0008*
	(- 5.802)	(- 5.521)	(-34.001)	(- 94.112)	(- 6.144)	(-23.125)
WORK79	0.0005*	0.0006*	0.0005*	0.0005*	0.0005*	0.0006*
	(34.922)	(11.588)	(95.844)	(162.246)	(25.119)	(52.441)
GRADE	0.047*	0.066*	0.054*	0.061*	0.064*	0.069*
	(13.197)	(7.653)	(41.245)	(91.363)	(10.6692	(28.088)
MARRIED	0.205*	0.244*	0.221*	0.243*	0.176*	0.236*
	(8.487)	(3.445)	(25.983)	(51.007)	(5.769)	(15.509)
R^2	0.354	0.357	0.426	0.403	0.313	0.320
N	5,589	744	40,338	135,298	3,506	13,826

a See Table 7 for variable definitions.
b Estimated coefficients for Equation 4 using those workers living in the Southwest.
c Estimated coefficients for Equation 4 using those workers not living in the Southwest.
*,*** Significant at the 1 percent level and 10 percent level, respectively.
NOTE: t-statistics are given in parentheses.

One possible explanation for the benefits of attending schools with higher pupil-per-teacher ratios is that students living in Southwest rural areas do not receive the same level of funding or the same quality of teacher as the more crowded urban schools. Future research is necessary to fully explore rural/urban schooling quality differentials across the United States.

Table 13: Estimation of Equation 4 using SW and NSW for LN(EPS)
Dependent Variable = LN(1979 Earnings)

Variable[a]	Mexican American γ^b	Mexican American β^c	Non-Hisp White γ^b	Non-Hisp White β^c	Black γ^b	Black β^c
Constant	4.462*	4.603*	5.650*	5.589*	5.493*	4.145*
	(16.625)	(4.612)	(58.836)	(97.108)	(15.159)	(23.485)
LN(EPS)	**0.297***	**0.272****	**0.156***	**0.169***	**0.141***	**0.320***
	(8.592)	(2.174)	(12.822)	(23.633)	(2.987)	(14.236)
EXP	0.413*	0.053*	0.052*	0.056*	0.044*	0.045*
	(17.159)	(7.272)	(59.941)	(120.698)	(13.458)	(29.462)
EXP^2	- 0.0007*	- 0.0008*	- 0.0009*	- 0.0010*	-0.0007*	- 0.0007*
	(-13.541)	(- 5.577)	(-50.619)	(-103.333)	(-11.134)	(-22.713)
WORK79	0.0006*	0.0005*	0.0005*	0.0005*	0.0005*	0.0006*
	(35.035)	(11.522)	(96.147)	(162.944)	(25.146)	(52.698)
GRADE	0.059*	0.063*	0.060*	0.060*	0.073*	0.065*
	(18.696)	(7.607)	(49.180)	(90.495)	(13.030)	(26.193)
MARRIED	0.220*	0.238*	0.230*	0.246*	0.180*	0.239*
	(9.059)	(3.371)	(26.859)	(51.997)	(5.852)	(15.943)
R^2	0.351	0.359	0.424	0.405	0.309	0.326
N	5,589	744	40,338	135,298	3,506	13,826

a See Table 7 for variable definitions.
b Estimated coefficients for Equation 4 using those workers living in the Southwest.
c Estimated coefficients for Equation 4 using those workers not living in the Southwest.
*,** Significant at the 1 percent level and 5 percent level, respectively.
NOTE: t-statistics are given in parentheses.

Table 13 displays the Southwest/non-Southwest regional analysis using Equation 4 for LN(EPS). Notice that the

LN(EPS) coefficients are positive and significant for all three ethnic groups regardless of the specified region. This suggests that **LN(EPS)** may be a more reliable measure of education quality than **LN(PPT)** because it is not as sensitive to other factors such as geographic regions.

5C: Overeducation and Education Quality

In light of the finding that overeducation affects only non-Hispanic whites, Sicherman's (1991) hypothesis of the inverse relationship between poor education quality and overeducation is relevant only for this group. If the value of the OE coefficient changes, then Sicherman's hypothesis will be supported. Recall that neither Mexican Americans nor blacks experience the overeducation penalty.

Table 14 shows the results from estimating two functional forms of Equation 7: one including both **LN(PPT)** and **LN(EPS)**, and the other including only **LN(EPS)**. When both education quality variables are included, the **OE** coefficient for non-Hispanic whites does not change in value or significance level, as seen in Table 14. The **OE** coefficient remains insignificant for blacks and Mexican Americans. However, it must be noted that the absolute value of the **OE** coefficient increases for Mexican Americans and decreases for blacks. This may be due to the opposite signs that the **LN(PPT)** variable has for these two groups when a regional sample is not specified.

Although **OE** does not change for whites when the education quality variables are entered into the earnings function, a rejection of Sicherman's hypothesis would be premature. Recall that **LN(PPT)** appears to incorporate factors other than education quality. To avoid including these other effects, a regression was run using only **LN(EPS)**, which is also displayed in Table 14.

Table 14: Results from Estimating Equation 7
Dependent Variable = LN(1979 Earnings)

Variable[a]	Mexican American[b]	Non-Hisp White[b]	Black[b]	Mexican American[c]	Non-Hisp White[c]	Black[c]
Constant	3.521*	5.155*	4.831*	4.812*	5.616*	4.782*
	(7.845)	(60.473)	(13.490)	(19.011)	(126.184)	(32.797)
LN(PPT)	0.670*	0.137*	- 0.013	-------	-------	------
	(3.480)	(6.338)	(- 0.149)			
LN(EPS)	0.163*	0.165*	0.237*	0.250*	0.158*	0.239*
	(4.002)	(29.076)	(11.435)	(7.718)	(28.374)	(12.766)
OE	- 0.025	- 0.083*	- 0.002	- 0.009	- 0.081*	- 0.002
	(-0.719)	(-16.174)	(- 0.101)	(- 0.273)	(- 15.812)	(0.115)
EXP	0.033*	0.053*	0.044*	0.043*	0.055*	0.044*
	(8.979)	(101.976)	(23.921)	(18.992)	(135.448)	(31.661)
EXP^2	-0.0006*	- 0.0009*	- 0.0007*	- 0.0007*	- 0.0010*	- 0.0007*
	(-9.463)	(-97.746)	(-21.461)	(-14.764)	(-114.302)	(-24.532)
WORK79	0.0006*	0.0005*	0.0006*	0.0006*	0.0005*	0.0006*
	(36.817)	(188.686)	(58.126)	(36.785)	(188.789)	(58.152)
GRADE	0.056*	0.064*	0.066*	0.060*	0.065*	0.065*
	(16.293)	(95.450)	(25.666)	(19.046)	(98.610)	(25.860)
MARRIED	0.214*	0.240*	0.225*	0.219*	0.242*	0.225*
	(9.273)	(58.015)	(16.666)	(9.536)	(58.393)	(16.691)
R^2	0.351	0.411	0.321	0.350	0.411	0.321
N	6,335	175,701	17,338	6,335	175,701	17,338

a See Table 7 for variable definitions.
b Estimation of Equation 7 including both LN(PPT) and LN(EPS).
c Estimation of Equation 7 excluding LN(PPT).
* Significant at the 1 percent level.

The results from the regression using only LN(EPS) do not provide an unambiguous conclusion to reject or support Sicherman's hypothesis. The absolute value of the OE coefficient for whites falls from 8.3 percent to 8.1 percent. Yet, the change in this variable is small. Future research should be conducted to determine the viability of Sicherman's hypothesis. One possibility would be to incorporate Hanushek's (1971) supposition that educational output partly depends on schooling quality as well as peer and household influences.

6. Concluding Remarks

Two divergent issues exist in this country regarding education. One branch of the labor-economics literature implies that workers, especially minority workers, suffer from an overeducation earnings penalty. The results presented here, however, indicate that the overeducation penalty for Mexican Americans and blacks is a statistical artifact. That is, this thesis provides evidence to suggest that V-V's (1988) purported overeducation earnings penalty for Mexican Americans and blacks result from an empirical misspecification of their earnings function.

However, this study finds that overeducated non-Hispanic whites do earn less than their adequately educated counterparts. Sicherman's overeducation hypothesis was tested for this group, but this group's overeducation penalty decreased slightly when EPS was introduced in their earnings function. Consequently, empirical support of Sicherman's hypothesis requires additional scrutiny.

The second education issue explored in this thesis involves the influence of education quality on labor-market earnings. This paper agrees with previous studies (e.g., Johnson and Stafford, 1973; Behrman and Birdsall, 1983; Dávila, 1991b), which have found that increases in state expenditures-per-student increase earnings.[15] This study

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[15]To my knowledge, only one study (Hanushek, 1971) does not find that an increase in education quality such as EPS would affect achievement outcomes for Mexican Americans.

also finds that the internal rates of return to EPS are about the same for Mexican Americans, blacks, and non-Hispanic whites.[16]

This thesis supports Chiswick's (1988) suggestion that an increase in education quality should increase the rate of return to education. In addition, Mattila (1982) states that an increase in the rate of return to school further increases school enrollments. Hence, it is plausible that an increase in education quality for Mexican Americans may close both the quantity and quality education gap between Mexican Americans and non-Hispanic whites.

While the results of this thesis contribute to the understanding of the educational experience of Mexican Americans, future research is still necessary for the issues presented in this thesis. Education quality must be further refined to include the effects of household and peer variables, as suggested by Hanushek (1971). Also, more specific schooling quality measures should be estimated. One avenue of inquiry would be to survey <u>specific</u> school districts to better account for intra-state biases in education quality. This may help explain the Southwest/non-Southwest variations in the effects of pupil-per-teacher ratios. Another interesting avenue would be to theoretically and empirically account for the overeducation

[16]See Footnote 14.

earnings penalty for non-Hispanic whites. These research endeavors may be useful for determining appropriate policy measures aimed at improving the education and economic situations of Mexican Americans in our society.

APPENDIX: MEAN VALUES OF INDEPENDENT VARIABLES*

Variable	Mexican American	Non-Hispanic White	Non-Hispanic Black
LN(PPT)	3.203	3.203	3.220
	(0.116)	(0.123)	(0.124)
LN(EPS)	7.860	7.754	7.672
	(0.292)	(0.299)	(0.337)
OE	0.097	0.154	0.124
	(0.296)	(0.361)	(0.329)
EXP	16.624	18.131	18.784
	(13.958)	(14.315)	(14.698)
EXP^2	471.137	533.636	568.843
	(664.759)	(667.638)	(743.762)
WORK79	1909.503	2043.309	1865.170
	(649.411)	(642.276)	(662.287)
GRADE	12.932	15.120	13.712
	(3.893)	(3.014)	(3.285)
MARRIED	0.705	0.716	0.611
	(0.456)	(0.451)	(0.488)

* This appendix does not include exclusive data for the Southwest and non-Southwest. These means are based on the sample from the United States as a whole.

Note: Standard Deviations are given in parentheses.

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