THE ACQUISITION AND LABOR MARKET VALUE OF FOUR ENGLISH SKILLS: NEW EVIDENCE FROM NALS

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This study investigates the factors related to proficiency in understanding, speaking, reading, and writing English among immigrants using data from the 1992 National Adult Literacy Survey (NALS). It also investigates the earnings–English relationship for each of these four skills to establish which is more valuable in the labor market. English as a Second Language (ESL) courses, education, and years in the United States are found especially to affect English proficiency. Furthermore, the returns on oral proficiency are greater than the returns on literacy skills, although writing skills are more valuable than reading skills. The study concludes that English acquisition is a dynamic process, rather than static as argued by supporters of English-only legislation. An increased role for ESL courses in the acquisition of English is suggested as an alternative policy to English-only laws as long as the marginal cost is less than the marginal benefit. (*JEL* J00, J24, J61)

I. INTRODUCTION

Of the 25.8 million immigrants in the United States in 1997, 62% arrived after 1979 (U.S. Census Bureau, 1998), with the majority of these immigrants hailing from non-English-speaking countries in Latin America and Asia. It is not surprising, then, that recent immigrants have lower initial levels of English ability, as well as lower levels of education, than previous immigrants and their Western European counterparts (Funkhouser, 1996). These initial lower English skills have generated perceptions that the new immigrants are refusing to learn English, and thus creating permanent cultural and linguistic divisions in the country (King, 1997). If recent immigrants are less likely to learn English voluntarily, then some argue that English-only laws will increase the English proficiency of immigrants. Acting on this belief, four bills to make English the official language were introduced by the 106th Congress (H.J. RES.21, H.R.50, H.R.123, H.R.1005). However, none of these proposed laws was based on research that demonstrates a need for them, nor was it clear whether these laws would actually increase the English proficiency of immigrants. The present study informs this debate by examining the factors associated with English proficiency and its labor market rewards using a more detailed data set than those available to past researchers.

Economic theory states that immigrants learn English as long as incentives exists to do so. Aside from nonpecuniary social benefits, one incentive is greater labor income. Immigrant wage studies that use data from national surveys, such as the Census and Current Population Survey (CPS), commonly find that self-reported English-speaking proficiency is associated with higher earnings. For example, Hispanic immigrants who do not speak English earn 17% less than immigrants who speak English (Borjas, 1994). Furthermore, studies of immigrant earnings find that the immigrant wage assimilation is explained by the increase in English-speaking skills resulting from more time in the United States (Funkhouser, 1996; Carliner, 1995).

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ABBREVIATIONS

CPS: Current Population Survey
ESL: English as a Second Language
NALS: National Adult Literacy Survey
PUMS: Public Use Microdata Sample

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Although the extent of assimilation is a matter of debate (see, e.g., Tienda and Liang, 1994), immigrants desiring to move from service and blue-collar occupations into white-collar and professional occupations must have adept and varied English skills. For example, newly arrived immigrants with limited command of English may be able to function in factory or agricultural jobs, but immigrants in professional occupations require high levels of vocabulary and literacy skills. The value added of greater English skills is potentially high. Immigrants who can read or write, therefore, would be expected to enjoy greater economic opportunities than immigrants who can only understand and speak small amounts of English. It is important, then, to examine the productivity effects of various dimensions of English.

It is likely, then, that other types of English proficiency besides speaking are also important in the labor market. If true, then using only one measure for overall English proficiency fails to capture the true English-earnings relationship. Given the existence of economic incentives to learning English, this study first explores which factors are related to proficiency in understanding, speaking, reading, and writing English, and then examines differences in immigrant earnings associated with various English skills.

Using four self-reported measures of English from the 1992 National Adult Literacy Survey (NALS), this study adds to the work of Carliner (1995), Chiswick (1991), and Espinosa and Massey (1997), among others, by extending the number of English variables that are analyzed and by using a national representative survey of immigrants. While Chiswick (1991), and Espinosa and Massey (1997) examine several dimensions of English proficiency, their studies do not consist of a random sample of immigrants. By using data from a survey of illegal immigrants, Chiswick (1991) is able to examine the determinants of English reading and speaking skills. He finds that years in the United States especially affect speaking proficiency, while education is a major factor determining reading proficiency. Similarly, Espinosa and Massey (1997) consider joint proficiency in speaking and understanding English among immigrants from over 20 Mexican communities and find that education and having children enrolled in U.S. schools increase the odds of proficiency.[1]

This study also extends the literature by examining the relationship between immigrant earnings and these four English skills.[2] Establishing the relative importance of each dimension of English proficiency is an important addition to the existing literature because many of the conclusions regarding the impact of English on earnings are derived from a single measure of English-speaking proficiency. The NALS data make it possible to determine which English skills are more valuable, which also has important policy implications. Knowing the returns on a particular English skill, for example, helps English-as-a-Second-Language (ESL) courses base their curricula on the skills that provide the greatest monetary benefit to immigrants. Furthermore, identifying which particular skills are relatively more valuable helps explain why immigrants may choose not to learn certain English skills.

II. THE NATIONAL ADULT LITERACY SURVEY

This study makes use of demographic and labor market information in the National Adult Literacy Survey (NALS). The NALS was carried out during the first eight months of 1992, and consists of 24,944 persons, with Hispanics and Blacks oversampled. The background variables are taken from a questionnaire given in either English or Spanish.

Information about understanding, speaking, reading, and writing English comes from the question, "In regards to the English language, how well do you (1) understand it when it is spoken to you? (2) speak it? (3) read it? (4) write it?" Persons rated their ability from "Very Well," "Well," "Not Well," to "Not At All." For consistency with the literature, immigrants are classified as proficient in any of these skills if they answer "Well" or "Very Well." It must be pointed out, however, that there is the potential for bias in the self-reporting of English ability, although the direction and extent of this bias are not known. This is a general

1. Hayfron (1999) examines proficiency in understanding, speaking, reading, and writing Norwegian, as well as the labor market rewards associated with these skills.

2. Chiswick (1991) and Rivera-Batiz (1991) consider the effect of English reading skills.

concern when using the majority of data sets, including the Census and CPS data. Kominski (1989) investigates this issue and finds evidence that the four ranges of English ability—Very Well, Well, Not Well, Not At All—are useful measures of English. He concludes that error in assessing English ability is reduced by collapsing these variables into two categories, such as Proficient (Very Well and Well) and Not Proficient (Not Well and Not At All), further justifying the definition of English proficiency in this study.

The sample here consists of male immigrants earning at least $40 per week, not older than 64 years of age, and from various non-English speaking countries.[3] Furthermore, those currently enrolled in school are also omitted. Immigrants with missing information are also dropped from the sample.[4] Of the total 2,579 foreign-born persons, 601 immigrants (or 23%) meet these sample restriction. The unweighted ethnic distribution among the 601 respondents is 6% black, 40% Mexican, 23% other Hispanic, 12% Asian, 16% white, and 3% other race.

The NALS questionnaire was available in only English and Spanish. This excluded immigrants who could not answer the questionnaire in these languages, and hence results in positive bias of English proficiency. In essence, the lack of more non-English questionnaires results in a bias since this excludes persons with low levels of English ability.[5]

III. ENGLISH LITERACY AND FLUENCY

A. Average English Proficiency

The English oral (speaking and understanding) and literacy (reading and writing) skills of immigrants are given in Table 1 separately by ethnicity and the language of the background questionnaire. Among the whole immigrant population, the rates of English speaking and understanding are greater than for reading and writing. Approximately 80% of all immigrants report oral proficiency, compared to about 65% in literacy skills. Even among those that used the Spanish-language questionnaire, the distribution of English ability is highest in oral skills. Of the total Spanish-questionnaire sample, for example, 15% report an ability to understand English, while less than 5% can read or write proficiently.

Among immigrants who answered the English-language questionnaire, Whites are the most English-proficient immigrants in three out of four English skills. But Black, Asian, and "other race" immigrants also have high levels of English skills. While about 95% of White immigrants are proficient at understanding and speaking English, respectively; 100% and 85% of Black immigrants are similarly skilled. At the opposite extreme, Mexican immigrants have the lowest oral proficiency rate all groups—even if they answer the English-language questionnaire—with an oral-proficiency rate of about 65%. The next lowest skilled group are non-Mexican Hispanics, who understand and speak English proficiently at a rate of 79% and 51%.[6]

Similar ethnic rankings hold for reading and writing skills, although the extent of proficiency is lower in the literacy than in oral skills. Consider, for example, White immigrants. Only 85% and 79% of them are proficient at reading and writing English, respectively. The rate of literacy is lowest among Mexican immigrants, with only 48% and 26% proficient at reading and writing English. As the major data sets measure English with speaking ability, Table 1 shows that such a measure is an overestimate of English skills.

Because all Spanish-speaking Hispanics had the option of answering the questionnaire in Spanish, the NALS contains a large percentage of Hispanics with very low levels of English proficiency. In all, 47% of all Hispanics used the Spanish-language

3. English-speaking countries are Australia, Bahamas, Bermuda, Canada, England, India, Ireland, Jamaica, New Zealand, Scotland, and Puerto Rico.

4. Twenty-three persons who attended grades 0–8 or 9–11, but did not specify their highest completed grade, were given the average grade for that education group (5 and 10, respectively).

5. This sample restrictions may create a biased portrait of the English ability of immigrants since it includes individuals with the greatest economic incentives to learn English. In particular, labor force participants may have higher skills than persons not in the labor force (such as nonworking spouses, or retired senior citizens). However, as the goal is to measure the language reaction to economic incentives, it is reasonable to examine this sample of immigrants.

6. Applying similar sample restrictions to the 1990 5% U.S. PUMS file reveals that 94% of black, 50% of Mexican, 66% of Hispanic, 83% of Asian, 93% of White, and 80% of other immigrants speak English proficiently.

TABLE 1
English Proficiency of Immigrants by Ethnicity and Language of Questionnaire[a]

	Questionnaire Language	Understands	Speaks	Reads	Writes
Total	English ($n = 420$)	0.83	0.78	0.70	0.60
		(0.02)	(0.02)	(0.02)	(0.02)
	Spanish ($n = 181$)	0.15	0.07	0.04	0.03
		(0.03)	(0.02)	(0.01)	(0.01)
Black	English ($n = 33$)	1.00	0.85	0.60	0.55
		(0.00)	(0.06)	(0.09)	(0.09)
	Spanish ($n = 0$)	—	—	—	—
Mexican	English ($n = 115$)	0.68	0.61	0.48	0.26
		(0.04)	(0.05)	(0.05)	(0.04)
	Spanish ($n = 127$)	0.19	0.09	0.04	0.03
		(0.03)	(0.02)	(0.02)	(0.02)
Other Hispanic	English ($n = 88$)	0.79	0.71	0.64	0.58
		(0.04)	(0.05)	(0.05)	(0.05)
	Spanish ($n = 52$)	0.05	0.02	0.04	0.04
		(0.03)	(0.02)	(0.03)	(0.03)
Asian	English ($n = 72$)	0.78	0.81	0.79	0.74
		(0.05)	(0.05)	(0.05)	(0.05)
	Spanish ($n = 0$)	—	—	—	—
White	English ($n = 93$)	0.96	0.94	0.85	0.79
		(0.02)	(0.02)	(0.04)	(0.04)
	Spanish ($n = 2$)	0.42	0.42	0.00	0.00
		(0.49)	(0.49)	(0.00)	(0.00)
Other Race	English ($n = 19$)	0.83	0.69	0.80	0.69
		(0.09)	(0.11)	(0.09)	(0.11)
	Spanish ($n = 0$)	—	—	—	—

Source: National Adult Literacy Survey, 1992.
[a]Total sample size is 601. Sample weights are used. Standard errors are given in parentheses.

questionnaire.[7] Since Hispanics of all ranges of English proficiency were eligible for inclusion in the NALS (in contrast to non-Spanish speakers with extremely low English proficiency), it is not surprising that they would report lower English ability than non-Hispanics. Although separating immigrants by type of questionnaire reduces this shortcoming in the data, it is still the case that Hispanics report lower levels of English proficiency than other ethnic groups.

Table 2 presents the correlation between the four English skills, and the correlation between the two oral English variables is generally greater than between oral and literacy variables, and less across oral and literacy skills. In most instances, the correlation between speaking and understanding is near 70%, while the correlation between understanding and reading (or writing), and speaking and writing (or reading) are always less. Furthermore, the correlation between oral and literacy skills is greater for other Hispanics than any other group. While the correlations for other groups are generally below 60%, over 70–80% of Hispanics who understand and speak English also read and write English. It is unclear what specific factors account for this outcome—their education level, for example, is lower than for other groups by 3–5 years. In all, Table 2 suggests that the four dimensions of English may be collapsed into two dimensions: oral and literacy skills.

B. Regression Analysis

The above results establish that English has at least two dimensions. Since learning English is a costly endeavor rewarded in the labor market, it is instructive to discover what

7. The two non-Hispanic persons who answered using the Spanish-language questionnaire were born in Brazil and Portugal.

TABLE 2
English-Proficiency Correlation by Ethnicity[a]

		Understands	Speaks	Reads	Writes
Black					
	Understands	—			
	Speaks	—	1.00		
	Reads	—	0.47	1.00	
	Writes	—	0.43	0.90	1.00
Mexican					
	Understands	1.00			
	Speaks	0.73	1.00		
	Reads	0.67	0.70	1.00	
	Writes	0.47	0.50	0.69	1.00
Other Hispanic					
	Understands	1.00			
	Speaks	0.85	1.00		
	Reads	0.73	0.80	1.00	
	Writes	0.70	0.82	0.90	1.00
Asian					
	Understands	1.00			
	Speaks	0.77	1.00		
	Reads	0.51	0.42	1.00	
	Writes	0.63	0.56	0.88	1.00
White					
	Understands	1.00			
	Speaks	0.65	1.00		
	Reads	0.40	0.49	1.00	
	Writes	0.40	0.26	0.72	1.00
Other					
	Understands	1.00			
	Speaks	0.68	1.00		
	Reads	0.39	0.16	1.00	
	Writes	0.67	0.35	0.76	1.00

Source: National Adult Literacy Survey, 1992.
[a]Total sample size is 601. Sample weights are used.

factors lead to different levels of proficiency across the four skills. The empirical model is

$$E_{si} = X_{si}\beta + \varepsilon_{si} \tag{1}$$

where E_{si} equals 1 if immigrant i is proficient in skill s, for $s = \{$speaking, understanding, reading, or writing$\}$, and 0 otherwise. X_{si} is a vector of individual characteristics consisting of age, years-in-the-U.S. dummy variables, ethnicity dummy variables, interaction of ethnicity with a Spanish-questionnaire dummy variable, and a variable interacting education with country-of-birth language. Also included are two dummy variables indicating whether the immigrant ever took a course to learn English skill s and if the immigrant completed this course. The effects of age and the Spanish-language questionnaire on English proficiency are postulated to be negative, while years in the United States (conditional on factors described below), education, and ESL courses are postulated to have positive effects. The impact of ethnicity, independent of the Spanish-language questionnaire effect, is unclear.

(i) Results. Equation (1) is estimated separately for each English skill using a probit procedure, and Table 3 reports only the marginal effects, evaluated at the mean of all

TABLE 3
Marginal Effects of Dependent Variables on English Proficiency

	Understands		Speaks		Reads		Writes	
	M.E.	**(S.E.)**	**M.E.**	**(S.E.)**	**M.E.**	**(S.E.)**	**M.E.**	**(S.E.)**
Age	**−0.012**	(.003)	**−0.011**	(.003)	**−0.008**	(.003)	**−0.012**	(.003)
Years in U.S.								
6–10	**0.228**	(.046)	**0.202**	(.063)	**0.103**	(.084)	**0.123**	(.089)
11–15	**0.268**	(.042)	**0.263**	(.058)	**0.187**	(.083)	**0.205**	(.092)
16–20	**0.277**	(.038)	**0.390**	(.041)	**0.237**	(.083)	**0.316**	(.094)
21–30	**0.323**	(.036)	**0.370**	(.043)	**0.388**	(.071)	**0.497**	(.083)
31–40	**0.319**	(.034)	**0.424**	(.033)	**0.459**	(.054)	**0.543**	(.077)
Over 40	**0.240**	(.038)	**0.351**	(.034)	**0.340**	(.115)	**0.487**	(.123)
ED × Spanish Language	**0.036**	(.008)	**0.039**	(.009)	**0.064**	(.01)	**0.068**	(.011)
ED × European Language	**0.026**	(.017)	**0.023**	(.015)	**0.095**	(.016)	**0.078**	(.014)
ED × Asian Language	**0.031**	(.011)	**0.017**	(.011)	**0.101**	(.014)	**0.089**	(.013)
ED × Other Language	**0.031**	(.011)	**0.023**	(.01)	**0.096**	(.014)	**0.080**	(.012)
Mexican	**−0.387**	(.214)	**−0.413**	(.173)	**0.286**	(.154)	**−0.125**	(.155)
Mexican × Spanish Ques.	**−0.408**	(.081)	**−0.526**	(.073)	**−0.524**	(.065)	**−0.287**	(.082)
Other Hispanic	**−0.337**	(.244)	**−0.363**	(.184)	**0.255**	(.148)	**0.069**	(.167)
Other Hisp. × Spanish Ques.	**−0.728**	(.069)	**−0.646**	(.066)	**−0.507**	(.073)	**−0.353**	(.065)
Asian	**−0.409**	(.23)	**−0.068**	(.174)	**−0.162**	(.153)	**−0.093**	(.13)
Black	—[a]		**0.090**	(.138)	**−0.046**	(.155)	**0.034**	(.148)
Other Race	**−0.220**	(.237)	**−0.206**	(.18)	**0.233**	(.149)	**0.128**	(.171)
White × Spanish Ques.	**−0.351**	(.454)	**−0.217**	(.451)	—[a]		—[a]	(.076)
Taken course to learn this English skill	**−0.124**	(.067)	**−0.095**	(.074)	**−0.219**	(.075)	**−0.219**	(.083)
Completed course to learn this English skill	**0.248**	(.055)	**0.285**	(0.64)	**0.288**	(.076)	**0.330**	(.083)
Observed proficiency	0.64		0.60		0.53		0.46	
Predicted proficiency at means of variables	0.76		0.66		0.55		0.39	
N	568		601		599		599	
Log likelihood	−180.0		−195.6		−1945		−198.7	

Source: National Adult Literacy Survey, 1992.

Note: Dependent variable is a 0–1 indicator of proficiency, where proficiency is defined as "Well" or "Very Well." Sample weights are used. The marginal effect of dummy variables is for a change from 0 to 1. Standard errors of the marginal effect (M.E.) are given in parentheses.

[a] Dropped due to lack of variance in variable.

the variables.[8] By controlling for years in the United States, the marginal effect of age is interpreted as the effect of age at arrival on English proficiency. In general, arriving later in life is associated with lower odds of proficiency, and the effects are similar across all four English skills. The marginal effects are not trivial, however. For example, an immigrant that arrives at age 30 is about 10 percentage points less likely to be proficient at any skill than an immigrant who arrives at age 20. These results differ from Chiswick's (1991) findings that age is not statistically significant variable in a logit regression of speaking ability, but is marginally significant in a logit regression of reading proficiency.[9]

8. The model was also estimated with the dependent variable equal to 1 only if the person rated their English ability "Very Well." Several different results from those presented below are observed using this definition: the quantitative effect of years in the U.S. on literacy and oral ability diminished; education has a smaller effect on literacy skills; ethnicity has a smaller quantitative and statistically meaningful effect; and the net effect of ESL courses on proficiency is at best very small. However, the literature's definition of proficiency includes "Well." Kominski (1989) also argues in favor of this definition.

9. The quantitative effects from Chiswick's (1991) findings are not immediately comparable because he does not report the marginal effects of each coefficient.

The years-in-the-U.S. estimates overstate the effect of years in the United States if the skills of recent immigrants are lower than the skills of earlier immigrants (Borjas, 1994). Nevertheless, if the bias is the same across all four skills, then it is possible to compare the *differential effect* of years in the United States on the four English skills. Time in the United States is associated with a higher probability of proficiency, but this effect differs for oral and literacy skills. During the initial 20 years in the United States, immigrants are more likely to become orally proficient than literate by approximately 10 percentage points.[10] After 20 years in the United States, however, proficiency in reading and writing is generally more likely by about 13 percentage points. In general, then, the first two decades in the United States is associated with greater investments in oral skills, but the acquisition of literacy skills improves dramatically after this time.

The effect of schooling on English proficiency is allowed to vary with the native language of immigrants. In all, each additional year of schooling increases the probability of literacy more than the probability of oral proficiency. A Spanish-speaking immigrant with 8 years of education, for example, is about 16 percentage points less likely to be proficient in oral skills than another Spanish-speaking immigrant with a high school diploma. The additional 4 years of schooling, on the other hand, increases the probability of literacy by 25 percentage points.

In general, the marginal effect of one year of schooling is greater on literacy than oral proficiency. Since reading and writing English are more technical and specialized skills, it appears that schooling is more important for literacy skills than for oral skills. Dustman (1997) and Hayfron (1999) similarly argue that the acquisition of literacy skills requires greater investment beyond simple exposure to the language, which may be more significant for speaking and understanding. Overall, these varying effects of education may explain why recent immigrants—who have lower levels of education than earlier immigrants *and* come from Latin America—are less literate than earlier immigrants.

Only those immigrants that chose the Spanish questionnaire are less likely to be proficient than White immigrants. The lower probability ranges from nearly 30 points for Mexicans in the Writing regression, to 73 points for other Hispanics in the Understands regression. With these figures, 15 years of U.S. residence would negate this effect. Otherwise, ethnicity plays a minimal role explaining differences in English language proficiency.

(ii) ESL Courses. Controlling for whether or not an immigrant ever took a course to learn English does not yield the expected results. Those who did take but did not complete such a course are *less likely* to be proficient in any of the four skills than immigrants who never enroll, with the marginal effects ranging from -10 to -22 percentage points. Those who take *and complete* a course to learn English, however, are at least 25 points more likely to be proficient than those who fail to complete an ESL course. In total, those who take and complete an ESL course have higher rates of English proficiency than persons who do not take a course: the probability of proficiency is higher by 7 to 11 percentage points for literacy, and greater by 13 and 19 points for oral ability.

To address to potential effects of unobserved characteristics, self-selection into ESL courses, or other factors that affect the decision to enroll in and complete ESL courses, a two-stage model was estimated. For example, persons that live in ethnic enclaves (Gonzalez, 1998) potentially face less pressure to learn English because everyday communications and activities do not necessarily require English ability. These individuals, therefore, have lower incentives to enroll in an ESL course, all else equal, than persons living outside of such enclaves.

In the first stage, the odds of enrollment in an ESL course (no enrollment = 1, enrollment only = 2, completion = 3) was a function of age, years in the United States, marital status, race, and Spanish-language questionnaire, the log of weekly

10. Carliner (1995) uses 1980 and 1990 Census data to control for assimilation and cohort effects and finds that an immigrant with 10 years of U.S. experience has an 11% higher probability of fluency than a newly arrived immigrant. Therefore, while the cross-sectional estimates here seem to overestimate the rate of English assimilation, comparing across English skills yields results similar to those of Carliner.

wages, and dummy variables if another language besides English is always used while shopping, watching television, listening to the radio, while working, or visiting with friends. The predicted values of each outcome from four multinomial regressions were obtained and the appropriate pair (ESL course in speaking/understanding, or ESL course in reading/writing) were included in each English proficiency regression. Those who only enrolled in ESL courses (ESL dropouts) were statistically more likely than nonenrollees to become proficient in speaking and understanding English, and were statistically as likely to become proficient in reading and writing as nonenrollees. On the other hand, completing the ESL course has twice the quantitative impact than just enrolling in the course, and increases the probability of English proficiency by the same amount on all four English skills: a 1 percentage point increase in the likelihood of completing the ESL course implies a 1 percentage point increase in the probability of proficiency in all four English skills.

The key variables in the first stage were dummy variables indicating the use of another language, such as at work or while shopping. These variables are reasonable identifying variables because theoretically they are correlated with the decision to enroll, but not with the ability to learn English. For example, if the language at work or at grocery stores is Spanish, then the incentives for immigrants to attend ESL courses is lower, independent of their capabilities to learn English.

This suggests that enrolling in ESL courses at worse only aids the acquisition of speaking and understanding skills, and at best increases the likelihood of proficiency in all four skills. Regardless of the estimation procedure, it is clear that completing an ESL course is associated with higher English skills. This conclusion is also reached by Hayfron (1999), who examined the impact of participation in a Norwegian language training program. Although ESL courses are not used by all immigrants (some of whom do not need the courses), it is clear that immigrants who complete these courses have higher levels of English ability. It is important, then, to examine what can be done to provide ESL courses to immigrants who desire them (McArthur, 1998; Venezky and Wagner, 1996).

If ESL courses are effective in teaching English to immigrants new policies should be considered to increase accessibility as long as the marginal cost of remedying these problems is less than the marginal social benefit from increased immigrant English skills.

IV. ENGLISH SKILLS AND EARNINGS

Section III demonstrated that the correlation of English skills is lowest between literacy and oral variables. Since most national surveys contain information only on speaking ability, this heterogeneity in English skills implies a possible mismeasurement of English ability in earnings regressions due to omitted-variables bias. The existence of four variables in the NALS makes it possible to evaluate the relative productivity value of these skills. This section adds to the research of Chiswick (1991), and Rivera-Batiz (1990, 1991), for example, who recognize the limitations of a single English variable in earnings regressions.

A. Returns to Four English Skills

The effect of each English variable on earnings is derived from a regression of log weekly wages on worker characteristics. The estimated regression model is

$$\text{Ln}\, w_i = X_i\beta + E_{si}\rho_s + \varepsilon, \tag{2}$$

where $\text{Ln}\, w_i$ is the natural logarithm of derived weekly earnings of immigrant i, and X_i is a vector of variables affecting wages, E_{si} is a dichotomous variable equal to 1 if immigrant i is proficient in English skill s, and ε is an error term. β and ρ_s, are coefficients to be estimated. Due to less English-language information, previous studies could not use all four English variables in the same specification. If it is the case that one or two English ability variables do not capture all of the English-earnings relationship, then such a regression has an omitted-variables problem.

Therefore, five different regressions are estimated. Only the English variable coefficients are shown in the first column of Table 4, but the full regression results are available upon request. In Table 4, the top section shows the four coefficients from four separate regressions in which each English variable was entered separately.

TABLE 4
Regression Results: Effect of English Ability on Wages

English Proficiency	Coefficient Estimates[a]	Not Proficient Income	Change in Income Due to Proficiency
English variables included individually in Log Wage Regression[a]			
Understanding	**0.156***	$377	16.7%
Speaking	**0.155***	$379	17.2%
Reading	**0.116****	$393	12.2%
Writing	**0.118****	$396	12.6%
English variables included jointly in Log Wage Regression[a]			
Speaking	**0.085**	$399	8.9%
Understanding	**0.078**	$399	8.1%
Reading	**− 0.004**	$410	−0.4%
Writing	**0.054**	$425	5.6%
Speaking, Reading, Understanding, and Writing		$366	23.8%
Speaking, Understanding, and Writing		$365	24.3%
Speaking, and Understanding		$376	17.7%
Speaking, Understanding, and Reading		$377	17.2%
Speaking, Reading, Writing		$387	14.5%
Understanding, Reading and Writing		$388	13.6%
Writing, and Reading		$411	5.1%

Source: National Adult Literacy Survey, 1992.

Note: The predicted values are from the log wage regressions.

[a]Estimates are from five log weekly wage regression of age, age squared, years of schooling, marital status, ethnicity, years-in-the-U.S. dummy variables, region of residence, and a constant. The first four regressions include each English variable separately, and the last regression includes all four English ability variables jointly. Full results are available upon request.

* Significant at the 1% level.

** Significant at the 10% level.

The estimated English coefficients for speaking and understanding imply that immigrants who are proficient in oral skills earn 16% more than otherwise similar immigrants who are not proficient. As speaking is the only English variable reported in the Census, a similar regression model using data from the 1990 U.S. 5% PUMS file was estimated. The estimated coefficient of the proficiency variable is 0.154. Therefore, the NALS English data provide a relationship between speaking proficiency and earnings almost identical to that of the Census data. When reading or writing replace understanding or speaking in the regressions, the returns on English falls by 4 percentage points to 0.12, or a decrease of about 25%. This is further evidence that English ability may be collapsed into two dimensions.

The impact of reading on weekly wages is similar to the effect implied by Rivera-Batiz (1990). His results imply that a one standard deviation increase in reading skills increases the reading skills of the average immigrant from "intermediate" to "adept," and therefore, it is more than likely that this change in reading skills is comparable to an indicator of becoming proficient in reading. The 1 SD increase in reading skills in Rivera-Batiz's study raises income by 13.5%, a figure similar to the 12% found in this study.

It is possible to examine the omitted-variable argument in the bottom section of Table 4, where the coefficient estimates are from a regression that jointly include all four variables. Individually, each variable is insignificant and lower in magnitude than the estimates in the individual regressions, but an F test rejects the hypothesis that they are jointly insignificant. The sum of the two oral variables is 0.163, which is only slightly bigger than the individual estimates of speaking and understanding. The F test that the sum of these two variables is not equal to 0.16 is rejected at the 5% significance level. However, the sum of the reading and writing coefficients is only 0.051, and the hypothesis that these two variables are different from 0 is not rejected. On the other hand, an F test fails to reject the joint significance

of all four variables at the 10% significance level. The full effect of English on earnings is 0.214, which translates into 24% higher wages.[11] This implies that proficiency in all four dimensions results in a wage that is 7 percentage points higher than the standard speaking–earnings prediction.

These coefficient estimates are different than Chiswick's (1991) estimates of reading and speaking. His coefficient estimates for reading and speaking on weekly wages are approximately 16% and 6%, respectively, when both are included jointly, although each is statistically insignificant. However, the *sum* of these coefficients is 0.218, an amount similar to the sum of the four coefficients in the bottom section of Table 4. However, because he does not report the F statistic of the joint significance of these two variables, it is not possible to gauge their statistical joint effect on weekly wages. Furthermore, the different nature of the sample examined by Chiswick, as well as by Rivera-Batiz (1990), makes it impossible to compare their results to the findings in this study.

B. Extension

Column 2 of Table 4 presents the predicted weekly income due to lack of proficiency in each English skill, while column 3 shows the change in income resulting from proficiency. The top section shows the predicted earnings for the specifications that include only one English variable. For example, the first row indicates that the predicted weekly income of immigrants who are not proficient at understanding English is $377, while those who are not proficient at speaking English earn an average of $379. Those that become proficient at speaking or understanding English increase their earnings by about 17%. The percentage increase in earnings for reading or writing proficiency is only about 12%. Compared to results based on Census data, these findings suggest that Census-data estimates are at the upper end of the earnings–English relationship.

The bottom section of Table 4 shows the change in earnings due to a change in English skills, holding other English skills constant at their average values. For example, proficiency in only speaking raises immigrant income by approximately 9% (from $399 to $434).[12] Similar and smaller effects are associated with proficiency in only understanding (8%), reading (−0.4%), or writing (6%). The remaining rows consider the effects of proficiency in various combinations of English skills. Increases of 14–18% are observed when joint proficiency is first achieved in understanding and speaking, understanding and writing, or speaking and writing. The greatest gain (24%) is observed in the acquisition of oral (speaking and understanding) and writing proficiency; the increase in income associated with proficiency in all four skill is also 24%. These figures suggest that reading skills are not likely to contribute to higher earnings among immigrants who are not proficient in any English skill. Use of Census data fails to capture this aspect of English ability.

V. SUMMARY AND DISCUSSION

This study used the National Adult Literacy Survey to investigate the determinants of the proficiency of immigrants in four English skills: understanding, speaking, reading, and writing. On average, immigrants have greater mastery of English speaking and understanding skills than reading and writing. The most important variables that explain part of this difference are years in the United States, education, and ESL-class participation. During the initial years in the United States, oral skills are learned much more quickly than literacy skills, but literacy skills improve significantly after more than 20 years in the United States. Formal education aids English acquisition but is more important for literacy than oral proficiency. One possible reason why immigrants report higher levels of oral fluency is because immigrants acquire the skills most valued by the labor market. Another reason is that the costs of learning how to speak and understand English are lower than those of reading and writing—it is easier to learn how to speak and understand English.

The implication for policy makers is that ESL courses are perhaps the most efficient

11. The sum of the coefficients from a specification that excludes reading is 0.213, while the sum from a specification that excludes writing is 0.197.

12. These figures are calculated by comparing all the wages in which proficiency in a set of English skills is reported to wages in which proficiency is not reported. The average of all combinations of proficiency is then estimated.

mechanisms by which to increase the English skills of immigrants beyond the effect of exposure to U.S. institutions. Increased information about the availability of ESL courses, and increased basic education, may result in greater ESL course success. The cost of providing additional ESL courses or streamlining current ESL courses should be compared to the potential social gains.

The relationship between earnings and each English variable revealed that oral skills yield the greatest monetary reward. However, *F* tests show that oral and writing variables explain the relationship between English and earnings better than other specifications; reading skills may not be as important for immigrant earnings as other skills.

The English-earnings relationships reveal that the greatest increase in earnings is observed among immigrants with few or no English skills. Once they attain proficiency in several skills, further proficiency does not increase wages substantially. Combined with the finding that immigrants nevertheless continue to acquire reading skills after 20 years in the United States, this finding suggests that immigrants learn English for noneconomic reasons.

The findings, therefore, shed doubt on the assumption that immigrants must be forced to learn English via legislation such as that considered by Congress and numerous states. The fact that immigrants become proficient in certain skills despite small (if any) economic returns suggests that they learn English for social reasons, perhaps to aid them in their acculturation into American society.

REFERENCES

Borjas, George J., "The Economics of Immigration," *Journal of Economic Literature*, *32*:4, December 1994, 1667–1717.

Carliner, Geoffrey, "The Language Ability of U.S. Immigrants: Assimilation and Cohort Effects," NBER Working Paper Series 5222, 1995.

Chiswick, Barry R., "Speaking, Reading, and Earnings Among Low-Skilled Immigrants," *Journal of Labor Economics*, *9*:2, April 1991, 149–170.

Dustmann, Christian, "The Effects of Education, Parental Background and Ethnic Concentration on Language," *Quarterly Review of Economics and Finance*, *37*:0 (special Issue), 1997, 133–156.

Espinosa, Kristin, and Douglas S. Massey, "Determinants of English Proficiency among Mexican Migrants to the United States," *International Migration Review*, *31*:1, Spring 1997, 28–50.

Funkhouser, Edward, "How Much of Immigrant Wage Assimilation Is Related to English Language Acquisition?" Department of Economics, University of California–Santa Barbara, 1996.

Gonzalez, Arturo, "Mexican Enclaves and The Price of Culture," *Journal of Urban Economics*, *43*:2, March 1998, 273–291.

Hayfron, John E., "Language Training, Language Proficiency and Earnings of Immigrants in Norway," Vancouver Centre for Excellence: Immigration, Simon Fraser University, 1999.

King, Robert D., "Should English Be the Law?" *The Atlantic Monthly*, *279*:4, April 1997, 55–64.

Kominski, Robert, *How Good Is 'How Well'? An Examination of the Census English-Speaking Ability Question*, *Proceedings of the Social Statistics Section*, 1989, 333–338.

McArthur, Edith, *Adult Participation* in *English-as-a-Second Language (ESL) Classes*, Washington, D.C., National Center for Education Statistics, 1998.

Rivera-Batiz, Francisco L., "English Language Proficiency and the Economic Progress of Immigrants," *Economic Letters*, *34*:3, November 1990, 295–300.

Rivera-Batiz, Francisco L., "The Effects of Literacy on the Earnings of Hispanics in the United States," in Edwin Melendez, Clara Rodriguez, and Janis Barry Figueroa, eds., *Hispanics in the Labor Force: Issues and Policies*, Plenum, New York, 1991, 53–75.

Tienda, Marta, and Zia Liang, "Poverty and Immigration in Policy Perspective," in Sheldon H. Danzinger, Gary D. Sandefur, and Daniel H. Weinberg, eds., *Confronting Poverty: Prescriptions for Change*, Harvard University Press, New York, 1994, 330–364.

U.S. Census Bureau, *The Foreign Born Population: March 1997 (Update) P20-507 and PPL-92*, U.S. GPO, Washington, D.C., 1998.

Venezky, Richard L., and Daniel A. Wagner, "Supply and Demand for Adult Literacy Instruction in the United States," *Adult Education Quarterly*, *46*:4, Summer 1996, 197–208.