The Use of Language and Culture: Does Speaking a Non-English Native Language Hurt or Benefit Immigrant Wages?

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Abstract

Using the 5% IPUMS version of the 2000 Census, this paper finds that, compared to another immigrant who has a job that requires less human-interaction on a daily basis, an immigrant worker who possesses knowledge in speaking a non-English language and who works in a human-interaction-intensive occupation would enjoy an average wage benefit of 4.28%. Also, for those who work at a job that values language usage and cultural familiarity, immigrants from the same country of origin are perceived as substitutes, while those from another country would be complements, a finding that is in accordance with the standard labor supply theory, holding demand constant. Moreover, a one standard deviation increase in bilateral trade volume between the United States and the immigrant's country of origin is predicted to enhance the immigrant's returns to working in the Wholesale Trade industry by 3.36% on average, a pattern that is very different for immigrants who came from a country that uses English as an official language.

1 Introduction

Factors that influence wage rates have been one of the central interests in the immigrant research field. Many researchers have found that, due to their lack of English fluency, immigrants earn a lower wage rate compared to native workers (Borjas (1987, 1999, 2001); Chiswick and Miller (1995, 1998)). Although it is true that immigrants who are from a non-English-speaking country

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have a disadvantage in English proficiency, they have this asset of speaking a non-English language, such as fluency in a foreign language and knowledge about the goods and services market in other countries, which may enable them to be more productive at their jobs. If this hypothesis holds, then immigrants should be rewarded for this ability that distinguishes them from other native workers. In the literature, not much effort has been devoted to study this effect of a non-English language and cultural fluency on immigrant wages. To fill this gap, this paper explores aspects in which the detrimental effect of English deficiency on immigrant wages might be counteracted by positive labor market returns to speaking another language. In particular, through studying the value of language and knowledge in a foreign culture and industries where trade is a major activity in the business, a new perspective on factors influencing immigrant wages will be derived.

The first focus of this paper is to observe the effect of job requirements and the match with firms on immigrant wages. That is, immigrants who work at firms that value a foreign language and cultural skill should be paid more compared to those with similar attributes working in firms that do not have a need to use a foreign language. Specifically, does an immigrant who works in an area with heavy human-interaction on a daily basis earn higher wages compared to his counterpart who works in a field that values language to a lesser extent?

There are two possible channels through which proficiency in a non-English language can be beneficial to an immigrant. First, if an immigrant works in a job surrounded by individuals who share the same language and cultural background, the need to use English might be so low that they would choose to use their mother tongue to communicate with each other. For instance, for a Chinese immigrant who works as a salesperson in an area inhabited mainly by Chinese immigrants, the ability to speak Chinese readily distinguishes him from other native workers who are better at speaking English. Not only would this Chinese salesperson be able to communicate with a potential Chinese customer in their native language, but he may also understand the needs of an individual from the same cultural background, thus being better able to serve the customer. In addition, if an immigrant works with coworkers who share the same language background, they might choose to use their native language to communicate in the workplace. In this case, although English is the main language used in the United States, it might not also be the language of choice among this group of workers. If workers are able to initiate better communication at work, which enhances their productivity, then they may be compensated with a higher wage rate for this increase in productivity. This concept is similar to Borjas' (1991) notion of "ethnic capital," which is uniquely present among immigrants according to their ethnic culture. In this paper, the ability and choice of speaking one's mother tongue with other immigrants from the same cultural background can be viewed as a type of ethnic capital. With this ethnic capital, English might not necessarily be the sole language of choice used by immigrant workers.

An interesting note to the perspective suggested above concerns the effect of an increase in the pool of labor which possesses a specific skill in foreign language and culture. Holding demand constant, when there is a larger supply of labor who speaks the same non-English language, the equilibrium wage would be driven down. However, demand could also increase as a result, since the ability to speak this foreign tongue could further induce a greater customer base, which, in turn, increases the productivity of workers who speak this non-English language, therefore equilibrium wages paid could be driven up as well. As a result, there is no definite conclusion on how fluency in a foreign language and culture could affect an immigrant's wages earned. This issue could be addressed by the empirical results, which would be further explored in the next section.

Given the large number of immigrants living in the United States, whose language and cultural ability could be valued by firms that have connections with trading partners in a foreign country, the second purpose of this paper is to study whether working in an industry where international trade is large would contribute to the wages earned by immigrants. For example, the demand for a non-English language fluency could be high in the trade sector, particularly for firms with partners from foreign countries that may not adapt English as their official language(s). For example, Gould (1994) inspects the existence of an "immigrant information effect," which explains how fluency in a foreign language reduces trading costs when that language is indeed the official language of the trading partner's country. Using the log of U.S. exports of goods to one's home country as the outcome variable, he finds that the proportion of immigrants, relative to the total population in the United States, is predicted to positively affect bilateral trade volume. Therefore, hiring immigrant workers would reduce the firm's cost, since not only could the workers provide manpower, but they could also serve as an interpreter when the firm deals with its foreign trading partner. Additionally, immigrants who have lived in their home country for years would gain information on what kind of goods their country would be efficient in producing, which is a valuable piece of information to a firm. Furthermore, not only would immigrants have better information on the type of goods that their home country has a comparative advantage in producing, but they also possess information on the type of goods demanded, which would potentially enhance trading opportunities (Rauch and Trindade (1999);

Chiswick and Miller (2002)). As a result, if immigrant workers could provide more information on potential trading opportunities to the firm, they would then receive a higher wage rate in return.

Although the above situations illustrate how the ability to speak a non-English language would be beneficial to the firm, the wage rate that a firm offers to an immigrant worker may be bounded if there is already an ample supply of that type of workers. In particular, holding labor demand constant, if there are a lot of immigrants who share the same language background in the area where the firm is located, the benefits of knowing a foreign language might cease, since there is a large supply of labor, holding other attributes constant. However, if the language ability of an immigrant is unique (such as having only a few German-speaking immigrants working in a region heavily occupied by Spanish-speaking immigrants), then the associated language skill is scarce, thus raises its value from the firm's perspective. As a result, the firm might be willing to offer a higher compensation in order to attract this worker. In other words, concentration of immigrants who share the same language background may also affect the returns to knowing a language.

Regression results show that, compared to another immigrant who has a job in another field, having a human-interaction-intensive job is associated with a positive wage gain of 4.47% on average. Regarding immigrant concentration, an increase in the percent of immigrants born in the same country as the individual under study is predicted to negatively affect his wages, while an increase in the percent of immigrants born in another country seems to enhance his wage rate. This addresses the issue that an increase in labor force that shares a common non-English language may drive the equilibrium wages down (holding labor demand constant) or up (when the ability to speak a foreign language increases the potential customer base that an immigrant worker can serve, which increases labor demand). Judging from the results, it seems that the former force carries a stronger influence compared to the latter. Furthermore, trade volume appears to positively affect the returns to working in the Wholesale Trade and the Transportation and Warehousing industries, on average. Specifically, for an immigrant worker serving in the Wholesale Trade sector, a one standard deviation increase in the bilateral trade volume between the United States and his home country is predicted to increase his wages by 3.36%[1].

[1] A separate set of regressions is run on individuals working in the manufacturing industry, with the reasoning that it is a sector that encounters verbal communication and foreign partnership more frequently. In manufacturing, workers may use their more fluent language to communicate in the workplace. In addition, import and export activities are more likely to take place, which induce a need for interpreters and someone who knows the foreign trading opportunities better. Therefore firms would be willing to compensate qualified workers with a higher wage rate. However, regression results are not that different compared to the main results. In addition, the coefficient

This paper is organized as follows. Section 2 outlines a theoretical model that suggests an empirical framework, while section 3 provides details on the data sets used. The empirical strategy adopted is then described in section 4. Regression results are discussed in section 5. In section 6, additional checks are performed. Lastly, concluding remarks are given in section 7.

2 Theoretical Model and Hypotheses

To provide further understanding on the possibility that non-English language proficiency affects immigrant wages, a theoretical model based on the one developed in Bacolod, Blum, and Strange (2007) is described in this section.

As discussed in Lucas (1977), a worker's wage function can be treated as a hedonic equation, where wages are determined according to each of the characteristics that such worker possesses. Following this logic to study situations in which proficiency in a non-English language affects wages earned, it means that, for a firm that requires language as an input in its production function, the ability of a worker to speak a particular language will be taken into account in the wage determination process. In Bacolod, Blum, and Strange's (2007) model, which aims at explaining the effect of agglomeration in a city on worker i's productivity, marginal product of labor is dependent on the match between workers and firms located in various urban synergies. Applying this framework to discuss why two workers with identical skills set might receive different wages, the marginal productivity of labor for a worker with foreign-language and cultural ability is influenced by whether he works in a firm that requires such ability or not. That is, if this worker works in a firm that requires the usage of a non-English language (for instance, working in a trading firm), then he should receive a higher wage rate compared to a worker who works in another firm. In other words, the match between the firm and the worker is important.

Marginal product of labor, *MP*, is represented as:

$$MP = A + \delta^{*} a \tag{1}$$

estimates on the *Trade volume* variable are consistently insignificant across all specifications. Therefore the associated estimates are not reported.

where	A	$=$	worker's physical marginal product of labor, excluding language ability
	δ	$=$	probability of a language match between the firm and the worker
	a	$=$	inherent value of a match with the firm

In other words, worker i's marginal product of labor depends not only on his working ability (A), but also on whether his language ability fits the need of the firm ($\delta^* a$), which depends on the probability of the job match between the firm and the worker. Equalizing marginal product of labor with wages, $w(z_i)$, which depends on the skill set, z_i, possessed by worker i, one gets

$$w(z_i) = A + \delta^* a \tag{2}$$

The above model suggests that the composite set of skills a worker possesses has an impact on his subsequent wages. In the market, if the worker (supplier) is endowed with a particular skill (such as foreign language fluency and cultural knowledge) that is of high value to the firm (demander), then the associated marginal product of labor would induce the firm to pay a higher wage rate to compensate for this additional skill unavailable in other workers. In addition, the match between the worker and the firm, defined by the set of skills required by the firm and that supplied by the worker, influences the worker's wages as well. Not only would a better match enhance worker productivity, which benefits the firm, but the worker would also receive a higher wage rate to compensate for possessing a skill not found in other candidates. Since mastery in a non-English language is usually one of the key elements that distinguishes an immigrant worker from a native worker, for a firm that requires this skill, an immigrant worker would subsequently earn a higher wage rate if he works in the firm, compared to another immigrant who has the same language ability but works in another firm that does not value foreign language fluency. An example of the type of firm that pays more for a worker with a language skill could be firms in the trade or sales industry, where human interactions take place at a heavier level. As a result, the model suggests that, for an immigrant worker whose mother tongue is non-English, working in an industry that values language usage would carry a positive effect on wages.

Under a competitive labor market, an excess supply of labor would induce a lower equilibrium wage rate. What this means is that, when there is a limited number of jobs that require language usage but with a constant inflow of labors who are proficient in that language, there should not be a difference in wages offered. As a result, even though a worker possesses a skill that suits the particular need of a firm, he would not receive a higher wage rate under a competitive labor market. However, studies in the literature (for example, Krueger and Summers (1988)) have argued for the existence of differential wages observed across industries, such as paying workers wages according to their distinctive characteristics to retain workers from leaving the industry. As a result, an immigrant worker who is fluent in speaking a language needed by a firm would still receive a higher rate of return compared to another worker who has similar attributes, but works at a job that does not require the use of language.

One of the main hypothesis tests performed will be that, for an immigrant, living in an area occupied by others with a similar language background and working in a profession where communication skill is highly valued, being proficient in his native language could carry an ambiguous effect on wages, compared to another immigrant with a similar background who works in another occupation. For example, if there is an increase in immigrants possessing similar language and cultural background, then, holding labor demand constant, having more immigrants entering the labor market would shifts labor supply to the right (as shown in Figure **??**), which results in a decrease in wages. However, an increase in the number of immigrants who possess the same language and cultural background would also potentially increase labor demand, since these immigrants could be able to attract a wider customer base, especially if these customers came from the same country. As a result, holding labor supply constant, labor demand would increase (as shown in Figure **??**), thus increases the equilibrium wages paid in the market. Since both labor supply and labor demand could shift, the result of having more immigrants entering the labor market on wages paid could be ambiguous (Figure **??**).

Moreover, previous studies have found the tendency of clustering among immigrants (Lazear (1998; 1999)). Although living in an area filled with individuals who do not speak English well would hinder an immigrant's rate of English adaptation, it could, at the same time, create business opportunities for the immigrant. For instance, if this immigrant worker happens to hold a job that requires a heavy language usage, such as being a salesperson, the ability to speak a common non-English language would allow this immigrant to attract a broader customer base in the language enclave, for there is not a clear need to use English during the transaction. To test this hypothesis, a variable capturing percent of immigrants who came from the same country of origin will be incorporated in the regression framework. Furthermore, under the standard labor supply model with homogeneous workers, an increase in supply would reduce the equilibrium wage rate, holding demand constant. By testing whether the percent of immigrants residing in a particular county would positively or negatively affect the returns to working in an area with an intensive language usage, one may be able to infer whether immigrant workers who came from the same country are substitutes or complements to each other.

In order to draw valid conclusions, it would be ideal to control for ability and family background effects. However, these two factors remain unobserved in the data set, which means the coefficient estimates on the occupation-related variable are probably biased in all of the regression results.

3 Data

Two data sets will be used to perform the above hypothesis tests. To obtain information on individual characteristics, including country of birth, average hourly labor wages, English proficiency, gender, race, marital status, age, occupation, industry, residential location, and years in the U.S., the 5% Integrated Public Use Microsample Series (IPUMS) version of the 2000 Census will be used. Although the Census contains the majority of information needed, it has several disadvantages. First, it does not contain a direct measure on whether an individual speaks a non-English language. Second, there is also no direct measure on a non-English language fluency contained in the Census. These problems are resolved by matching the individual's place of birth with the main language(s) used in the respective country. Through using **The World Factbook 2007**, published by the Central Intelligence Agency, official language(s) of various countries can be obtained. Combining this information with the assumption that an individual would be fluent in the official language(s) used in his home country, the mother tongue of this individual can be determined. This specification assumes there is no variation in language fluency, but only variation in the returns to acquiring that language according to the match between language needs and the occupation and industry that the individual works in.

A measure on the percentage of immigrants living in the same area as the individual under study is based on the *city* variable provided in the Census, which is then used to derive the county in which the immigrant lives in. To precisely calculate a county-level immigrant concentration measure, statistics of individual states are obtained from the Census web page[2]. This web page provides information on the total population of each county in a U.S. state, as well as the number of foreign-born individuals (grouped at a country level) residing in that particular county. Through dividing the number of foreign-born by total population, a county-level immigrant concentration measure is obtained[3]. The advantage of measuring immigrant concentration at the county level is that an individual is more likely to work in the same county as his county,

[2] *http://www.census.gov/qfd/states/*

[3] For details on the derivation, see the Appendix.

rather than city, of residence.

To test the effect of bilateral trade volume on wages earned by immigrants working in the trade industry, the 1972 to 2001 import and export data created by Feenstra (1996) and Feenstra, Romalis, and Schott (2002)[4], which capture the volume of trade between the United States and various countries at an industry level, are used[5]. As a result of the need to match up the industry codes listed in the Census and the Feenstra (1996) and Feenstra, Romalis, and Schott (2002) data, the trade volume variable used is classified by industry. However, these two industry classifications differ substantially, therefore the sum of import and export volume is created as a single trade volume variable used in regressions presented in this paper, which is a national measure identical for everyone who came from the same country. Further, this measure is standardized to have a zero-mean with a standard deviation of one.

4 Empirical Model

In order to observe the effect of language and cultural proficiency on immigrant wages, the following empirical framework will be utilized:

$$y_{cijk} = \alpha_1 + X_i'\beta + \gamma_1 MP_{cik} + \alpha_k + \alpha_c + Z'\gamma + \epsilon_{cijk} \tag{3}$$

In the above model, y_{cijk} represents the log hourly wage for individual i who speaks home country's language c, works in occupation j, and lives in county k in the United States. X is a vector signifying individual characteristics, such as age, educational attainment, gender, years since migration (and its square term), marital status, and two dummy variables, one set to unity if the individual came as a child immigrant (i.e., before the age of 14), while the other is set to one if the person speaks English.

The main variables of interest are captured in the MP_{cik} term, which includes factors that affect worker i's marginal productivity. One example would be the match between worker characteristics and that required for the job. For instance, if mastery of a non-English language

[4]Imports data are obtained from *http://cid.econ.ucdavis.edu/data/sasstata/usiss.html*, while exports information are found on *http://cid.econ.ucdavis.edu/data/sasstata/usxss.html*.

[5]Note that the *industry* variable in the Census and the industry information given in Feenstra's data sets are based on different classification systems. While the Census uses the *North American Industry Classification System* (NAICS) codes, Feenstra uses the *Standard Industrial Classification* (SIC) classification standard. This creates some difficulty in matching the data sets. In particular, after matching, there would only be three industries listed in the data set. They are agriculture, mining, and manufacturing. Details on how the codes are matched are discussed in the Appendix.

is valued at the job and this worker does indeed speak that language fluently, then his ability to speak this foreign language would enhance his marginal productivity. To study this effect, a dummy variable, $Human_{ij}$, will be set equal to one if individual i holds a job that requires more interpersonal communication skills, such as being a salesperson, a legal advisor, or a health practitioner[6]. That is, compared to another immigrant with similar observable attributes, would holding an occupation that involves more frequent human-interaction on a daily basis make a difference in wages earned by individual i?

Secondly, according to the standard labor model, holding demand constant, a shift in labor supply would also affect wages. To test whether immigrants who came from a different country of origin are viewed as complements or substitutes, *Percent Different Country* is incorporated in the model. More specifically, *Percent Different Country* is defined as the number of immigrants who originated from a country that is different from individual i's, divided by the total foreign-born population in a particular county that individual i resides in. By interacting this measure with $Human_{ij}$, the impact of an increase in labor supply on wages received by an immigrant who works in a human-interaction-intensive occupation can be studied. More specifically, through observing the coefficient estimate of this variable, one can deduce the substitutability of labor. That is, if the correlation between this variable representing the percent of other workers who share a different cultural and language background from the individual under observation and individual i's wages is negative, an increase in the number of workers from that particular group would reduce wages earned by i. Holding demand and other factors constant, workers belonging to that group could be substitutes to i.

Under the current framework, it is possible that other factors related to the characteristics of one's county of residence and occupational choice are omitted. For instance, a computer programmer might choose to live in a county in northern California, due to the number of related firms clustering in the Silicon Valley. As a result, failure to take county characteristics into account might result in a biased estimate on terms related to one's occupation. To capture the effects of unobserved county factors, a set of dummy variables representing an individual's county of residence, α_k, is created. As in many other immigrant wage rate studies, unobserved characteristics of one's country of origin could potentially be related to the individual's occupation or industry choice as well, thus biasing the coefficient estimate of industry-related regressors. As a remedy to this problem, a set of country of origin fixed effects dummies, α_c, is also incorporated in the regression model.

[6]For more information on occupations classified as human-interaction-intensive, see the Appendix.

To test whether bilateral trade volume between the U.S. and one's country of origin affects the returns to working in the trade industry, Z represents additional variables of interest, such as the 1972 to 2001 import and export trade volume, based on Feenstra's (1996) and Feenstra, Romalis, and Schott's (2002) data sets. In this paper, trade volume, $Trade_c$, measured at an international level, is defined as the sum of imports and exports quantity that an individual country trades with the United States[7]. To test whether $Trade_c$ alters the returns to working in the trade industry, it will be interacted with one's industry of work. One of the main coefficients of interest would then be the interaction between $Trade_c$ and a dummy variable signifying the Wholesale Trade industry, for this is probably the industry with the most need of using knowledge in a foreign language and culture in order to facilitate business transactions.

5 Regression Results

5.1 The Relationship between Working in a Human-Interaction-Intensive Occupation and Immigrant Concentration

One of the major differences between an immigrant and a native worker is their respective language ability. As discussed previously, the effect of an immigrant's fluency in a non-English language on wages may be positive if language use is valued highly in the immigrant's job need. To study whether this hypothesis holds true, a dummy variable, *Human*, is created to signify jobs that are more human-interaction intensive. For instance, *Human* is set to equal one for those who work as a salesperson, zero for those who are computer programmers. Regression results are recorded in Table **??**.

As shown in Table **??**, English ability and educational attainment are predicted to positively affect wages, which agrees with what has been found in other research work. An interesting trend to note is that coming to the United States at a younger age (before 14) seems to adversely affect wages in the sample used in this paper.

To study whether an immigrant's foreign language skill and cultural knowledge affect his wages earned when he works at a job that uses language more frequently, note that, holding country of origin and county of residence fixed, on average, an immigrant who has a job that requires a frequent need of communication is predicted to enjoy a wage gain of 4.47% (column (4)), compared to another immigrant whose job has less of an interaction need. In other words, holding other attributes, including English fluency, constant, working in an area that involves

[7] This measure is standardized to be mean-zero with a standard deviation of one.

more usage of language is projected to affect immigrant wages positively. Since immigrants are proficient in a non-English language in general, would the percentage of immigrants who live in the same county further affect one's returns associated with working in a language-intensive job? To address this issue, an immigrant concentration measure, *Percent Different Country*, which signifies the percentage of total immigrant population who came from a different country of origin but also live in the same county as i, is created. Results obtained are listed in Table **??**.

In Table **??**, variable *Percent Different Country*[8] represents the total percentage of all immigrants living in the county but came from a different country of origin compared to individual i. Assuming i works in the same area as where he lives, an increase in the number of individuals who speak a different foreign language might reduce his ability to attract more customers, thus adversely affect his wages. In addition, if immigrants who share the same language are homogeneous, holding other factors, including labor demand, constant, an increase in the supply of labor with a different background would result in a raise in the equilibrium wage rate, for this language ability is uniquely found in i. According to regression results, the second scenario seems to dominate, since a one standard deviation increase in the percent of immigrants who came from a different country is predicted to increase an immigrant's wages by 1.75 % (column (3)). Also, as shown in column (4), the percent of immigrants born in a different country does not affect the returns to working in an interaction-intensive job for an immigrant. However, for those whose job has a greater language component, a one standard deviation increase in the total percentage of foreign-born in a particular county is predicted to increase wages by 4.71%. This may suggest that there is a psychological factor contributing to an immigrant's consumption behavior. That is, an immigrant may feel more comfortable obtaining goods and services from another immigrant instead of a native English speaker, regardless of this immigrant's own native language. If this is the case, then the wage rate earned by an immigrant who serves in a language-intensive job might be positively correlated to the number of immigrants living in the county.

Moreover, although the above findings suggest immigrants who possess a different language and cultural background are perceived as complements, those who work in an occupation with a higher probability of language usage are still at an advantage in terms of wages earned. Compared to another immigrant who has a job that requires less language usage, wages earned by an immigrant with a more human-interaction-intensive occupation would be 4.28% higher

[8] All concentration measures included in this paper, such as *Percent Foreign Born* and *Percent Different Country*, are standardized to be mean-zero with a standard deviation of one.

(column (3)).

Holding observable characteristics, such as age and educational attainment, constant, these findings can be attributed to the value of language and cultural skills perceived by the firm. For instance, if there are more Chinese workers available in a certain county, holding demand constant, a firm with a need for Chinese language usage in its production could easily find substitutes for its workers. In other words, the value of knowing Chinese is lower, so the firm does not need to pay a premium to workers who speak Chinese in the firm. On the other hand, if this firm has a demand for Spanish-speaking workers, with a high Chinese immigrant concentration, the ability to speak Spanish is more valuable, thus induces the firm to pay more to attract and retain Spanish-speaking workers. As a result, those who came from the same country are perceived as substitutes, while those who emigrated from a different country are viewed as complements.

5.2 The Effect of Trade

As suggested in the introduction, not only can an immigrant provide information on the goods market in his home country, which creates more trading opportunities for the firm, but he can also serve as an interpreter during the business process. In either case, bilateral trade volume between the United States and one's country of origin might also affect wages earned by the immigrant worker. To test this hypothesis, this section concentrates on whether trade volume alters the effect of working in an industry with a higher probability to trade with foreign partners on wages. Regression results are shown in Table **??**[9].

If trade volume were to matter, it would most likely affect the returns to working in the trade industry, where it has a direct effect on the value that an immigrant worker brings to the firm. As shown from the coefficient of *Trade volume*Wholesale Trade* in column (2) of Table **??**, for an immigrant working in the Wholesale Trade sector, a one standard deviation increase in bilateral trade volume between the U.S. and his home country is predicted to increase his wages by 3.36%. On a related note, for an immigrant serving in the Transportation and Warehousing sector, where business opportunities could be enhanced with an increase in foreign trading partners, a one-unit increase in trade volume would induce a 3.64% increase in wages.

Although trade volume seems to affect the returns to working in industries that have business connections with foreign countries, two interesting observations are obtained from column (2), with respect to an individual working in the Professional, Scientific, and Management, or

[9] In Table **??**, those who work in the public sector are the omitted group. Also, trade volume and industry dummies are included in all of the regressions shown.

the Arts, Entertainment, and Recreation field. When trade volume increases by one standard deviation, the wages for an immigrant worker associated with the Professional, Scientific, and Management industry are predicted to decrease by 7.28%. One possible explanation is the amount of outsourcing currently utilized by firms in the U.S. Since R&D is a common activity that takes place in this industry, outsourcing to other foreign countries would reduce the value of foreign language ability among a local immigrant worker, for there is an abundant supply of workers who are proficient in both English and a non-English language in other parts of the world, where outsourcing takes place. Also, if major scientific research works are communicated in English and if fluency in a non-English language means less proficiency in English, the inability of an immigrant worker to use fluent English might be considered as a disadvantage in this field. As a result, an increase in trade volume between the United States and countries where firms based their outsourcing activity on could decrease wages earned by a local U.S. immigrant worker.

On the other hand, for a person working in the Arts, Entertainment, and Recreation industry, a one standard deviation increase in bilateral trade volume is associated with a 3.17% increase in wages earned by a local immigrant. This can be explained if the immigrant is viewed as a readily-available source to serve the industry's interest in foreign culture. That is, when a firm in the industry cooperates with foreign partners in producing entertainment products, a local immigrant worker who has already gained exposure to the respective country possesses a unique cultural knowledge that is valuable to the U.S. firm. To compensate for the value that this worker brings, the firm would subsequently offer a higher wage rate in return.

6 Additional Tests

6.1 Using the Subsample of Individuals who Came from a Spanish-Speaking Country

So far, an immigrant worker is seen as a liaison between the United States and his home country. However, from the language perspective, the value that an immigrant worker would add to the firm is not only bounded by his ability to communicate with others in his home country. That is, his ability to communicate with foreign trading partners who use the same mother tongue should also be taken into account. In this subsection, the sample is restricted to include only those who came from a Spanish-speaking country[10]. In this case, the potential value of a Mexican

[10] It would be ideal to study the effect of language fluency across countries that use i's language, but since most of the languages used in a particular country is less universal, which greatly limit variations available, only Spanish-speaking

immigrant worker is evaluated by his ability to communicate with other overseas customers who live in Spanish-speaking countries[11]. Regression results are provided in Table **??**.

Comparing column (4) between Tables **??** and **??**, the returns to working in a language-usage-intensive job are positive and statistically significant. However, the magnitude of the coefficient estimate on *Human* becomes larger on the Spanish-speaking immigrant sample. Compared to another immigrant who does not have a job that requires more human interaction, the wages earned by someone who does could be 7.78% higher (contrast to 4.28% shown in Table **??**). Another interesting observation is on the *Human*Percent Different Country*[12] term. For a Spanish-speaking immigrant who works at a job that involves more interaction with others, a one standard deviation increase in the percent of immigrants born from a different country is predicted to increase wages by 1.14%. This finding is different from that recorded when the whole sample is used. It is possible that, since Spanish is commonly used in many countries across the globe, the value that a Spanish-speaking worker brings to the firm is especially large. Therefore when there are less Spanish-speaking workers available in a county (that is, more non-Spanish-speaking immigrant workers), firms are willing to offer a higher wage rate to retain the worker with Spanish language ability who holds a job with heavy human-interactions. In addition, this finding suggests that the demand-side effect is greater than the supply-side effect. That is, although having more Spanish-speaking workers in the labor market could reduce the equilibrium wages paid (holding everything else constant), there is something unique among those who came from the same country of origin. For example, if there is a stronger cultural-tie among individuals from the same country, then an increase in the percent of immigrants born in another Spanish-speaking country would not affect an individual's desire to do business with another person who share the same cultural background. In this case, an increase in the percentage of immigrants born in a different country could make the individual's cultural value increase, and thus would affect his or her wages positively.

Also, as evident in Table **??**, for a Spanish-speaking worker who works in the Professional, Scientific, and Management industry, a one standard deviation increase in bilateral trade volume is predicted to adversely affect wages. As discussed before, this finding can be explained by English being the universal language used in research work. As a result, if a Spanish-speaking

countries are used to carry out this robustness test.

[11] These countries include Argentina, Bolivia, Chile, Colombia, Costa Rica, Cuba, Dominican Republic, Ecuador, El Salvador, Guatemala, Honduras, Mexico, Nicaragua, Panama, Peru, Spain, and Venezuela.

[12] In here, *Percent Different Country* refers to the percentage of immigrants who came from a different Spanish-speaking country compared to individual i. For example, if individual i's country of origin is Spain, then *Percent Different Country* is defined as the percent of immigrants who came from a Spanish-speaking country that is not Spain and who reside in the same county as individual i.

worker is not as proficient in English compared to others, the increase in activities in this industry may negatively affect his wages.

6.2 Immigrants from English-Speaking Countries

Holding other attributes constant, the biggest difference between a native and an immigrant worker is English ability. However, an immigrant who came from a country that readily utilizes English as (one of) its official language(s) may be viewed as being similar to a native worker, for their fluency in the English language could be almost identical. As discussed in the introduction, the reasons why an immigrant worker adds value to the firm are because of his knowledge in the services demanded by individuals with a similar background, as well as his capability to serve as an interpreter when the firm trades with a foreign partner located in his country of origin. When one focuses on an immigrant originated from an English-speaking country[13], the effect of serving as a verbal interpreter on wage compensation may be lessened. However, an immigrant with an English mother tongue could still contribute to the firm by providing information on the cultural aspect of his country of origin (Borjas' (1991) ethnic capital concept). Also, if working in a human-interaction-intensive occupation still magnifies the effect of working in an immigrant enclave, then studying the wage pattern earned by this particular immigrant would build insight into how an immigrant worker may contribute to the firm's profit by understanding the needs of customers who came from the same country.

Concentrating on column (4) of Table **??**, a one standard deviation increase in individuals born in a different country would induce a wage gain of 1.69% for an immigrant holding a job that encounters frequent human interactions, a finding that is very different from that recorded in Table **??**. Applying the standard labor supply argument, the ability of an English-speaking worker to deliver cultural knowledge specific to his country of origin is especially valued when such knowledge is scarce in the area, especially when this worker works at a human-interaction-intensive job. Some other differences between results obtained when the whole sample and those who came from an English-speaking country are on the coefficient estimates on the *Percent Different Country* (column (3)) and *Human*Percent Foreign Born* (column (4)) terms. In Table **??**, which uses the whole immigrant sample, for an immigrant worker with a job that uses language more frequently, a one standard deviation increase in the proportion of immigrants is associated with a 4.71% increase in wages. However, this effect diminishes if a worker immigrated

[13]English-speaking countries include Australia, Barbados, Canada, Ghana, Hong Kong, Ireland, Jamaica, New Zealand, Nigeria, Pakistan, Philippines, Sierra Leone, Union of South Africa, Thailand, Trinidad and Tobago, and the United Kingdom, as defined in the CIA's **The World Factbook 2007**.

from an English-speaking country (column (4), Table **??**). Also, the percent of immigrants who originated from another English-speaking country is predicted to not affect individual i's wages, a finding that is different from previously found in column (3) of Table 2, when the whole sample was used. A possible explanation for these findings is that, judging from a language point of view, an immigrant who came from a country that uses English as an official language is not very different from a native worker. When there are more immigrants living in the area, this immigrant's ability to speak English would not induce other immigrants to do business with him, for they could have worked with a native worker should language not be a concern during the consumption process. If this the case, then an increase in the percentage of foreign born would not alter the returns to working at a human-interaction-intensive job for an immigrant who came from an English-speaking country.

With respect to whether trade volume alters the returns to working in a certain industry, figures are very different for an immigrant who came from an English-speaking country compared to someone from a country that does not use English as an official language. For instance, unlike those reported in Table **??**, trade volume no longer affects the returns to working in the Wholesale Trade, Transportation and Warehousing, Professional, Scientific, and Management, nor Arts, Entertainment, and Recreation sectors. Instead, it is predicted to carry a positive effect on wages earned by an individual working in the Agriculture, Mining, Construction, or Manufacturing industry. It is possible that, since the majority of trading partners in these industries are English-speaking[14], the importance of being fluent in a non-English language is reduced. As a result, trade volume does not alter the returns to working in these industries for immigrants included in the original sample (Table **??**), but its association with the wages earned by an English-speaking immigrant worker would be positive[15].

7 Conclusion

The main findings in this paper are three-fold. First, the correlation between having a job that requires heavy human-interaction on a regular basis and wages is positive, regardless of whether an immigrant came from a country that utilizes a non-English official language or not. Second,

[14]For example, Canada, the largest trading partner with the United States, is also the largest electricity importer from the U.S. in 2000, according to the Energy Information Administration (2005).

[15]As in many other studies, the presence of unobservables might cause bias in the coefficient estimates obtained. Depending on the correlation between such unobservables and the *Human* dummy variable, the estimated coefficient might be biased upward or downward. To explore the possibility of having one's country of origin being correlated with his county of residence, a set of regression that incorporates country of origin $\times$ county of residence is performed. Since most of the results are similar to that reported in Table **??**, they are not reported here.

when the number of individuals with the same language background increases, the wage rate earned by an immigrant working with a human-interaction-intensive job would tend to decrease; when the number of workers who came from a different country increases, the associated wages earned by a particular immigrant would increase. This phenomenon implies that an immigrant's advantage in attracting more customers who share the same language background is not strong enough to induce a positive relationship between wages and the number of individuals born in the same country. That is, the demand-side effect is weaker than the supply-side argument, as shown in Figure **??**. Thus, this finding can be explained using a standard labor supply model. When the skill possessed by a worker is more unique, firms who need that language in its production function would be willing to offer a higher premium to attract the worker. On the other hand, when such worker's skill becomes common, the induced increase in labor supply, holding demand constant, would drive the equilibrium wage rate downward. Third, trade volume is empirically predicted to magnify the returns associated with working in the Wholesale Trade industry for an immigrant. Not only would this immigrant understand the needs of the goods and services market in his home country, but during the trading process, he can also serve as an interpreter for the firm, which makes him more valuable compared to a native worker who is similar in other aspects.

In addition to the above findings, it is also interesting to note that the effect of trade volume on wages earned by an immigrant working in various industries differs, depending on whether the immigrant came from an English-speaking home country or not. In particular, trade volume is predicted to have no effect on an immigrant with an English language background and who works in the Wholesale Trade industry. Instead, it is positively associated with wages earned when the English-speaking individual works in industries such as Mining, where U.S. firms tend to trade with countries that use English as an official language. This, however, does not imply that an immigrant coming from an English-speaking country would contribute to the firm in the same manner as a native worker, because a foreign-born individual still possesses a unique cultural knowledge that cannot be found in a native worker.

To study the effect of bilateral trade volume on immigrant wages, it would be ideal to measure trade volume at a finer measure, such as by industry instead of by country. Due to the difference in industry classification between the Census and the Feenstra (1996) and Feenstra, Romalis, and Schott (2002) data, trade volume by industry level was not easy to obtain. It would be interesting to perform this study again with a refined trade volume measure, which can be achieved when data becomes available.

References

[1] *1997 NAICS United States Structure, Including Relationship to 1987 U.S. SIC* (2000), Washington, D.C.: Census Bureau.

[2] Altonji, J.G. and D. Card (1989). "The Effects of Immigration on the Labor Market Outcomes of Natives," NBER Working Paper No. 3123.

[3] Bacolod, M., B.S. Blum, and W.C. Strange (2007). "Skills in the City," Working Paper.

[4] Betts, J.R. and M. Lofstrom (2000). "The Educational Attainment of Immigrants: Trends and Implications," in G. Borjas, ed., **Issues in the Economics of Immigration**. Chicago: University of Chicago Press for National Bureau of Economic Research: 51-115.

[5] Bleakley, H. and A. Chin (2003). "Language Skills and Earnings: Evidence from Childhood Immigrants," CCIS Working Paper No. 87.

[6] Borjas, G.J. (1987). "Self-Selection and the Earnings of Immigrants," *American Economic Review*, 77(4): 531-553.

[7] Borjas G.J. (1991). "Ethnic Capital and Intergenerational Mobility," NBER Working Paper No. W3788.

[8] Borjas, G.J. (1999). "The Economic Analysis of Immigration," in O. Ashenfelter and D. Card, eds., **Handbook of Labor Ecoonomics**. Amsterdam: North-Holland: 1697-1760.

[9] Borjas, G.J. (2001). **Heaven's Door: Immigration Policy and the American Economy**. New Jersey: Princeton University Press.

[10] Chiquiar, D. and G.H. Hanson (2005). "International Migration, Self-Selection, and the Distribution of Wages: Evidence from Mexico and the United States," *Journal of Political Economy*, 113(2): 239-281.

[11] Chiswick, B.R. and P.W. Miller (1995). "The Endogeneity Between Language and Earnings: International Analyses," *Journal of Labor Economics*, 13(2): 245-287.

[12] Chiswick, B.R. and P.W. Miller (1998). "Language Skills and Earnings Among Legalized Aliens," *Journal of Population Economics*, 12(1): 63-89.

[13] Chiswick, B.R. and P.W. Miller (2002). "Immigrant Earnings: Language Skills, Linguistic Concentrations and the Business Cycle," *Journal of Population Economics*, 15(1): 31-57.

[14] Church, J. and I. King (1993). "Bilingualism and Network Externalities," *Canadian Journal of Economics*, 26(2): 337-345.

[15] **The World Factbook 2007** (2007). Washington, D.C.: Central Intelligence Agency.

[16] Feenstra, R.C. (1996). "U.S. Imports, 1972-1994: Data and Concordances," NBER Working Paper No. 5515. Related data available on *The Center for International Data at UC Davis* website, *http://cid.econ.ucdavis.edu/*.

[17] Feenstra, R.C., J. Romalis, and P.K. Schott (2002). "U.S. Imports, Exports and Tariff Data, 1989-2001," NBER Working Paper No. 9387. Related data available on *The Center for International Data at UC Davis* website, *http://cid.econ.ucdavis.edu/*.

[18] Gould, D.M. (1994). "Immigrant Links to the Home Country: Empirical Implications for U.S. Bilateral Trade Flows," *Review of Economics and Statistics*, 76(2): 302-316.

[19] Hutchinson, W.K. (2002). "Does Ease of Communication Increase Trade? Commonality of Language and Bilateral Trade," *Scottish Journal of Political Economy*, 49(5): 544-556.

[20] "International Electricity Imports, All Countries, 1980-2005 for the *International Energy Annual 2005*" (2005). Washington, D.C.: Energy Information Administration. *http://www.eia.doe.gov/emeu/international/electricitytrade.html*

[21] Kahn, S. and K. Lang (1996). "Hours Constraints and the Wage/Hours Locus," *Canadian Journal of Economics/Revue Canadienne d'Economique*, 29(Part 1): S71-S75.

[22] Krueger, A.B. and L.H. Summers (1988). "Efficiency Wages and the Inter-Industry Wage Structure," *Econometrica*, 56(2): 259-293.

[23] Lang, K. (1986). "A Language Theory of Discrimination," *Quarterly Journal of Economics*, 101(2): 363-382.

[24] Lazear, E.P. (1998). "Diversity and Immigration," NBER Working Paper No. 6535.

[25] Lazear, E.P. (1999). "Culture and Language," *Journal of Political Economy*, 107(6): S95-S126.

[26] Leon, A. (2003). "Does 'Ethnic Capital' Matter? Identifying Peer Effects in the Intergenerational Transmission of Ethnic Differentials," Dissertation Chapter, MIT.

[27] Lucas, R.E.B. (1977). "Hedonic Wage Equations and Psychic Wages in the Returns to Schooling," *American Economic Review*, 67(4): 549-558.

[28] Rauch, J.E. and V. Trindade (1999). "Ethnic Chinese Networks in International Trade," NBER Working Paper No. 7189.

[29] Ruggles, S., M. Sobek et al. (2003). *Integrated Public Use Microdata Series: Version 3.0.* Minneapolis: Historical Census Projects, University of Minnesota.

Appendix

Details on derivation of variables used in this paper are provided in this section.

A Countries Included

The sample includes immigrants who came from 64 different countries, including Afghanistan, Argentina, Australia, Austria, Barbados, Bangladesh, Bolivia, Cambodia, Canada, Chile, China, Colombia, Costa Rica, Cuba, Czech Republic, Dominican Republic, Ecuador, Egypt, El Salvador, France, Germany, Ghana, Guatemala, Haiti, Honduras, Hong Kong, Hungary, India, Indonesia, Iran, Iraq, Ireland, Israel, Italy, Jamaica, Japan, Korea, Laos, Lebanon, Mexico, Malaysia, Netherlands, New Zealand, Nicaragua, Nigeria, Pakistan, Panama, Peru, Philippines, Poland, Portugal, Romania, Sierra Leone, Spain, Sweden, Syria, Union of South Africa, Taiwan, Thailand, Trinidad and Tobago, Turkey, the United Kingdom, Venezuela, and Yugoslavia. Countries that use English as (one of) its official language(s) are Australia, Barbados, Canada, Ghana, Hong Kong, Ireland, Jamaica, New Zealand, Nigeria, Pakistan, Philippines, Sierra Leone, Union of South Africa, Thailand, Trinidad and Tobago, and the United Kingdom. Spanish-speaking countries include Argentina, Bolivia, Chile, Colombia, Costa Rica, Cuba, Dominican Republic, Ecuador, El Salvador, Guatemala, Honduras, Mexico, Nicaragua, Panama, Peru, Spain, and Venezuela.

B Immigrant Concentration

Instead of using an immigrant concentration variable measured at a state-level, this paper uses information provided on the U.S. Census web page (*http://www.census.gov/qfd/states/*) to calculate a county-level immigrant concentration measure. Specifically, the Census web page provides information on the number of individuals born in a certain country, as well as the total population in a particular county of a state. In addition, the web page contains information on county definition, which lists the name(s) of the city (cities) that belong(s) to that particular county. Through matching the individual observation's city of residence to its corresponding county (counties) and the total population in the corresponding county (counties), the percent of individuals born from a particular non-U.S. country who reside in a county can be obtained. Note that, when a city is shown to locate at the boundary of multiple counties (such as the case for New York city, which is listed under the Bronx, Kings, New York, Queens, and Richmond counties), an average of the counties' total population is taken to derive the percentage of foreign-born living in that county. For instance, in the case of New York city, the percentage of immigrants born in Canada is calculated using the following formula:

$$\% \text{ of immigrants born in Canada} = \frac{\text{Number of individuals born in Canada}}{0.20 \times A}$$

where A equals the sum of total population in Bronx, Kings, New York, Queens, and Richmond counties.

C Industry

The industry dummy variables are defined according to the Census classification system, which is a set of 3-digit codes based on the 3- or 4-digit *North American Industry Classification System* (NAICS). Broader categories are also given in the Census, which combines similar elements in the industry classification into one general category. For example, under the more general *Agriculture, Forestry, Fishing and Hunting* group, there are six related industries listed (*Crop production*, *Animal production*, *Forestry except logging*, *Logging*, *Fishing, hunting, and trapping*, and *Support activities for agriculture and forestry*), each with a distinctive code (017, 018, 019, 027, 028, and 029, respectively). To match this information with the Feenstra (1996) and Feenstra, Romalis, and Schott (2002) data, which adopts a 1987 4-digit *Standard Industrial Classification* (SIC) system, the *1997 NAICS United States Structure, Including Relationship to 1987 U.S. SIC*, a publication released by the Census Bureau, is utilized. Although some of the NAICS codes provided in the reference contain 6 digits, meaning that industries are classified at a finer level, to make the reference useful in applying to the Census data set, only the first 4 digits are considered. Upon matching the NAICS codes with the SIC classification, trade volume in most of the industries can be identified. However, when there are ambiguities in the Feenstra or Feenstra el al. data (To gain further insight into the reasons for these ambiguities, see Feenstra (1996).), or when the NAICS codes cannot be easily matched to the SIC system, the related trade volumes are dropped from the sample.

Due to this complication in matching up industry definitions across three data sets, in all of the regressions ran, trade volume is grouped into three broad categories at an industry level: manufacturing, agriculture, and mining.

D Occupation

General occupation classifications are taken from the Census definitions. In the 2000 Census, each occupation is assigned a specific occupation code. Similar to the industry codes, occupation codes are grouped under more general categories. For example, 13 of the distinct occupation codes are combined to form the *Financial Specialist* group. In this paper, only the broader occupation classification is used to create occupation dummy variables. However, for the *Human* dummy variable, which is assigned a value of 1 for occupations that involve a heavier human-interaction on a regular basis, a combination of the broad and detailed occupation classifications are used. Occupations defined as interaction-intensive include *Management, Business and Financial Operations*, *Business Operations Specialists*, *Financial Specialists*, *Computer Support Specialists*, *Architects, Except Naval*, *Surveyors, Cartographers, and Photogrammetrists*, *Community and Social Services*, *Legal*, *Education, Training, and Library*, *Actors*, *Producers and Directors*, *Athletes, Coaches, Umpires, and Related Workers*, *Announcers*, *News Analysts, Reporters, and Correspondents*, *Public Relations Specialists*, *Editors*, *Healthcare Practitioners and Technical*, *Healthcare Support*, *Protective Service*, *Bartenders*, *Combined Food Preparation and Serving Workers, Including Fast Food*, *Counter Attendants, Cafeteria, Food Concession, and Coffee Shop*, *Waiters and Waitresses*, *Food Servers, Nonrestaurant*, *Hosts and Hostesses, Restaurant, Lounge, and Coffee Shop*, *Tour and Travel Guides*, *Child Care Workers*, *Residential Advisors*, *Sales*, *Telephone Operators*, *Tellers*, *Customer Service Representatives*, *Hotel, Motel, and Resort Desk Clerks*, *Interviewers, Except Eligibility and Loan*, *Loan Interviewers and Clerks*, *Receptionists and Information Clerks*, *Reservation and Transportation Ticket Agents and Travel Clerks*, and *Secretaries and Administrative Assistants*.

E A Country's Official Language

The World Factbook 2007, published by the CIA, contains detailed information on language(s) used in various countries. In most cases, it also lists explicitly which language is used as an official language in a particular country. Combining what is given in **The World Factbook 2007** and an individual's place of birth, variables signifying an individual's mother tongue can be identified. In case a country has more than one official languages, individuals originating from that country are assumed to be fluent in all of the official languages. For instance, since Chinese and English are both listed as the official languages in Hong Kong, immigrants coming from Hong Kong are, therefore, assumed to master both languages. As a result, the value for the language dummies *Chinese* and *English* are both set to be 1 for such immigrant.

Table 1: The Relationship between Working in an Occupation that Involves More Frequent Human Interaction and Immigrant Wages

	(1)	(2)	(3)	(4)
English Ability	0.1976*	0.1918*	0.1632*	0.1635*
	(0.0071)	(0.0071)	(0.0071)	(0.0071)
High School Graduate	0.1833*	0.1702*	0.1409*	0.1406*
	(0.0050)	(0.0050)	(0.0051)	(0.0051)
College Dropout	0.3763*	0.3660*	0.3093*	0.3118*
	(0.0055)	(0.0056)	(0.0059)	(0.0059)
College Graduate	0.7393*	0.7247*	0.6476*	0.6485*
	(0.0057)	(0.0059)	(0.0067)	(0.0067)
Child	-0.0834*	-0.0855*	-0.0953*	-0.0938*
	(0.0063)	(0.0063)	(0.0063)	(0.0063)
Human	0.0610*	0.0589*	0.0431*	0.0447*
	(0.0043)	(0.0043)	(0.0044)	(0.0045)
F(All county dummies jointly zero)		16.02		12.12
p-value		[0.0000]		[0.0000]
F(All country dummies jointly zero)			55.02	46.65
p-value			[0.0000]	[0.0000]
County Fixed Effects	No	Yes	No	Yes
Country Fixed Effects	No	No	Yes	Yes
N	139911	139911	139911	139911

[1] Regression results based on foreign-born immigrant workers aged 25 to 55 who came from a country with recorded bilateral trade volume between the United States and the respective country and who reside in a U.S. county where immigrant concentration data are available. Other regressors include dummy variables signifying educational attainment (whether the individual is a high school graduate, a college dropout, or a college graduate), a dummy variable signifying whether the person speaks English, another dummy variable set to unity for an individual who came as a child immigrant (before age 14), age, gender, years since migration (and its squared term), race, and marital status. County of residence and country of origin fixed effects dummies are included when applicable. Data source: 5% IPUMS version of Census 2000.

[2] * signifies 5% statistical significance. Robust standard errors shown in parentheses.

[3] *Child* refers to an immigrant who came to the United States before age 14. This is included in the regression because children immigrants tend to adopt to the English language at a faster rate compared to adult immigrants (See Bleakley and Chin (2003)).

[4] *Human* is a dummy variable assigned a value of one for those who hold a job that involves an intensive human interaction on a daily basis. An example includes salesmanship. See the Appendix for more details.

Table 2: The Relationship between Percentage of Immigrants from a Different Country of Origin, Occupation, and Immigrant Wages

	(1)	(2)	(3)	(4)
Human	0.0447*	0.0428*	0.0445*	0.0428*
	(0.0044)	(0.0044)	(0.0044)	(0.0044)
Human*Percent Foreign Born		0.0471*		0.0471*
		(0.0039)		(0.0039)
Percent Different Country			0.0175*	
			(0.0052)	
Human*Percent Different Country				0.0002
				(0.0041)
F(All county dummies jointly zero)	12.12	11.03	11.56	10.96
p-value	[0.0000]	[0.0000]	[0.0000]	[0.0000]
F(All country dummies jointly zero)	46.65	46.44	43.96	45.39
p-value	[0.0000]	[0.0000]	[0.0000]	[0.0000]
County Fixed Effects	Yes	Yes	Yes	Yes
Country Fixed Effects	Yes	Yes	Yes	Yes
N	139911	139911	139911	139911

[1] Regression results based on foreign-born immigrant workers aged 25 to 55 who came from a country with recorded bilateral trade volume between the United States and the respective country and who reside in a U.S. county where immigrant concentration data are available. Other regressors include dummy variables signifying whether the individual is a high school graduate, a college dropout, or a college graduate, age, gender, years since migration (and its squared term), a dummy variable signifying whether the person speaks English, race, a dummy variable set to unity for those who came before age 14, and marital status. County of residence and country of origin fixed effects dummies are included when applicable. Data source: 5% IPUMS version of Census 2000. Percentage of immigrants from respective countries who live in various counties in the U.S. is calculated using information obtained from *http://www.census.gov/qfd/states/*.

[2] * signifies 5% statistical significance. Robust standard errors shown in parentheses.

[3] *Percent Different Country* represents the percentage of immigrants who came from a different country of origin but live in the same county as the individual observation. This variable has been standardized to have a zero mean with a standard deviation of one. Without normalization, the sum of *Percent Same Country* (percentage of immigrants who share the same country of origin) and *Percent Different Country* should be one. Due to their complementarity in the sign of coefficient, only regression results using *Percent Different Country* are reported.

[4] *Human* is a dummy variable assigned a value of one for those who hold a job that includes intensive human interaction on a daily basis. An example of such job include salesmanship. See the Appendix for more details.

Table 3: The Effect of Bilateral Trade Volume between the United States and an Immigrant's Country of Origin on Immigrant Wages

	(1)	(2)
Trade volume*Agriculture	-0.0532	-0.0426
	(0.0297)	(0.0319)
Trade volume*Mining	-0.0825	-0.0201
	(0.0599)	(0.0600)
Trade volume*Utilities	-0.0596*	-0.0097
	(0.0293)	(0.0317)
Trade volume*Construction	-0.0412*	0.0042
	(0.0064)	(0.0125)
Trade volume*Manufacturing	-0.0370*	-0.0092
	(0.0038)	(0.0115)
Trade volume*Wholesale Trade	-0.0035	0.0336*
	(0.0049)	(0.0120)
Trade volume*Transportation and Warehousing	-0.0052	0.0364*
	(0.0095)	(0.0146)
Trade volume*Information and Communications	-0.0495*	-0.0063
	(0.0132)	(0.0139)
Trade volume*Finance, Insurance, and Real Estate	-0.0640*	-0.0079
	(0.0089)	(0.0138)
Trade volume*Professional, Scientific, and Management	-0.1197*	-0.0728*
	(0.0078)	(0.0146)
Trade volume*Educational, Health, and Social Services	-0.0736*	-0.0181
	(0.0059)	(0.0123)
Trade volume*Arts, Entertainment, and Recreation	0.0030	0.0317*
	(0.0050)	(0.0120)
Trade volume*Other Services	-0.0236*	0.0120
	(0.0076)	(0.0133)
F(All county dummies jointly zero)		11.42
p-value		[0.0000]
F(All country dummies jointly zero)		37.41
p-value		[0.0000]
County Fixed Effects	No	Yes
Country Fixed Effects	No	Yes
N	139911	139911

[1] Regression results based on foreign-born immigrant workers aged 25 to 55 who came from a country with recorded bilateral trade volume between the United States and the respective country and who reside in a U.S. county where immigrant concentration data are available. Other regressors include dummy variables signifying educational attainment (whether the individual is a high school graduate, a college dropout, or a college graduate), a dummy variable signifying whether the person speaks English, age, gender, years since migration (and its squared term), race, a dummy variable set to unity for those who came before age 14, and marital status. County of residence and country of origin fixed effects dummies are included when applicable. *Trade volume* is defined as the sum of import and export between 1972 and 2001 between the United States and an individual's home country, as obtained from Feenstra (1996) and Feenstra, Romalis, and Schott (2002). This variable is standardized to have a zero mean with a standard deviation of one. Data sources: 5% IPUMS version of Census 2000; Feenstra (1996), Feenstra, Romalis, and Schott (2002).

[2] * signifies 5% statistical significance. Robust standard errors shown in parentheses.

Table 4: The Relationship between Percentage of Immigrants from a Different Country of Origin, Occupation, and Wages Earned by Immigrants From Spanish-Speaking Countries

	(1)	(2)	(3)	(4)
Human	0.0789*	0.0771*	0.0787*	0.0778*
	(0.0060)	(0.0061)	(0.0060)	(0.0060)
Human*Percent Foreign Born		0.0145*		0.0141*
		(0.0058)		(0.0058)
Percent Different Country			0.0074*	
			(0.0034)	
Human*Percent Different Country				0.0114*
				(0.0045)
F(All county dummies jointly zero)	7.53	7.61	7.46	7.62
p-value	[0.0000]	[0.0000]	[0.0000]	[0.0000]
F(All country dummies jointly zero)	12.35	12.38	12.27	12.87
p-value	[0.0000]	[0.0000]	[0.0000]	[0.0000]
County Fixed Effects	Yes	Yes	Yes	Yes
Country Fixed Effects	Yes	Yes	Yes	Yes
N	72700	72700	72700	72700

[1] Regression results based on foreign-born immigrant workers aged 25 to 55 who came from a country that uses Spanish as its official language with recorded bilateral trade volume between the United States and the respective country and who reside in a U.S. county where immigrant concentration data are available. Other regressors include dummy variables signifying educational attainment (whether the individual is a high school graduate, a college dropout, or a college graduate), a dummy variable signifying whether the person speaks English, age, gender, years since migration (and its squared term), race, a dummy variable set to unity for those who came before age 14, and marital status. County of residence and country of origin fixed effects dummies are included when applicable. Data source: 5% IPUMS version of Census 2000. Percentage of immigrants from respective countries who live in various counties in the U.S. is calculated using information obtained from *http://www.census.gov/qfd/states/*.

[2] * signifies 5% statistical significance. Robust standard errors shown in parentheses.

[3] *Percent Different Country* represents the percentage of immigrants who came from a different Spanish-speaking country of origin (Argentina, Bolivia, Chile, Colombia, Costa Rica, Cuba, Dominican Republic, Ecuador, El Salvador, Guatemala, Honduras, Mexico, Nicaragua, Panama, Peru, Spain, or Venezuela) but live in the same county as the individual observation. This variable has been standardized to have a zero mean with a standard deviation of one.

[4] *Human* is a dummy variable assigned a value of one for those who hold a job that involves an intensive human interaction on a daily basis. An example includes salesmanship. See the Appendix for more details.

Table 5: The Effect of Bilateral Trade between the United States and Spanish-speaking Countries on Immigrant Wages

	(1)	(2)
Trade volume*Agriculture	-0.0205	-0.0130
	(0.0367)	(0.0385)
Trade volume*Mining	0.0939	0.0978
	(0.0696)	(0.0709)
Trade volume*Utilities	-0.0716*	-0.0317
	(0.0330)	(0.0363)
Trade volume*Construction	0.0043	0.0148
	(0.0083)	(0.0131)
Trade volume*Manufacturing	-0.0056	0.0034
	(0.0049)	(0.0112)
Trade volume*Wholesale Trade	-0.0042	0.0103
	(0.0061)	(0.0120)
Trade volume*Transportation and Warehousing	0.0139	0.0243
	(0.0112)	(0.0155)
Trade volume*Information and Communications	-0.0132	0.0079
	(0.0184)	(0.0211)
Trade volume*Finance, Insurance, and Real Estate	-0.0409*	-0.0200
	(0.0109)	(0.0151)
Trade volume*Professional, Scientific, and Management	-0.0677*	-0.0522*
	(0.0075)	(0.0127)
Trade volume*Educational, Health, and Social Services	-0.0456*	-0.0229
	(0.0071)	(0.0125)
Trade volume*Arts, Entertainment, and Recreation	-0.0206*	-0.0087
	(0.0062)	(0.0119)
Trade volume*Other Services	-0.0123	-0.0013
	(0.0088)	(0.0135)
F(All county dummies jointly zero)		7.32
p-value		[0.0000]
F(All country dummies jointly zero)		8.74
p-value		[0.0000]
County Fixed Effects	No	Yes
Country Fixed Effects	No	Yes
N	72700	72700

[1] Regression results based on foreign-born immigrant workers aged 25 to 55 who came from a country that uses Spanish as its official language (Argentina, Bolivia, Chile, Colombia, Costa Rica, Cuba, Dominican Republic, Ecuador, El Salvador, Guatemala, Honduras, Mexico, Nicaragua, Panama, Peru, Spain, and Venezuela) with recorded bilateral trade volume between the United States and the respective country and who reside in a U.S. county where immigrant concentration data are available. Other regressors include dummy variables signifying educational attainment (whether the individual is a high school graduate, a college dropout, or a college graduate), a dummy variable signifying whether the person speaks English, age, gender, years since migration (and its squared term), race, a dummy variable set to unity for those who came before age 14, and marital status. County of residence and country of origin fixed effects dummies are included when applicable. *Trade volume* is defined as the sum of import and export between 1972 and 2001 between the United States and an individual's home country, as obtained from Feenstra (1996) and Feenstra, Romalis, and Schott (2002). This variable is standardized to have a zero mean with a standard deviation of one. Data sources: 5% IPUMS version of Census 2000; Feenstra (1996), Feenstra, Romalis, and Schott (2002).

[2] * signifies 5% statistical significance. Robust standard errors shown in parentheses.

Table 6: The Relationship between Percentage of Immigrants from a Different Country of Origin, Occupation, and Wages Earned by Immigrants from English-Speaking Countries

	(1)	(2)	(3)	(4)
Human	0.0398*	0.0396*	0.0396*	0.0394*
	(0.0087)	(0.0087)	(0.0087)	(0.0087)
Human*Percent Foreign Born		0.0139		0.0098
		(0.0081)		(0.0082)
Percent Different Country			0.0070	
			(0.0059)	
Human*Percent Different Country				0.0169*
				(0.0067)
F(All county dummies jointly zero)	5.53	4.42	5.45	4.41
p-value	[0.0000]	[0.0000]	[0.0000]	[0.0000]
F(All country dummies jointly zero)	24.00	24.03	22.60	22.38
p-value	[0.0000]	[0.0000]	[0.0000]	[0.0000]
County Fixed Effects	Yes	Yes	Yes	Yes
Country Fixed Effects	Yes	Yes	Yes	Yes
N	25841	25841	25841	25841

[1] Regression results based on foreign-born immigrant workers aged 25 to 55 who came from a country that uses English as (one of) its official language(s) with recorded bilateral trade volume between the United States and the respective country and who reside in a U.S. county where immigrant concentration data are available. Other regressors include dummy variables signifying educational attainment (whether the individual is a high school graduate, a college dropout, or a college graduate), age, gender, years since migration (and its squared term), race, a dummy variable set to unity for those who came before age 14, and marital status. County of residence and country of origin fixed effects dummies are included when applicable. Data source: 5% IPUMS version of Census 2000. Percentage of immigrants from respective countries who live in various counties in the U.S. is calculated using information obtained from *http://www.census.gov/qfd/states/*.

[2] * signifies 5% statistical significance. Robust standard errors shown in parentheses.

[3] *Percent Different Country* represents the percentage of immigrants who came from a different English-speaking country of origin (Australia, Barbados, Canada, Ghana, Hong Kong, Ireland, Jamaica, New Zealand, Nigeria, Pakistan, Philippines, Sierra Leone, Union of South Africa, Thailand, Trinidad and Tobago, or the United Kingdom) but live in the same county as the individual observation. This variable has been standardized to have a zero mean with a standard deviation of one.

[4] *Human* is a dummy variable assigned a value of one for those who hold a job that involves an intensive human interaction on a daily basis. An example includes salesmanship. See the Appendix for more details.

Table 7: The Effect of Bilateral Trade between the United States and the Immigrant's Country of Origin, which Adopts English as an Official Language

	(1)	(2)
Trade volume*Agriculture	0.2804	0.3493*
	(0.1449)	(0.1752)
Trade volume*Mining	0.1952*	0.1669*
	(0.0720)	(0.0838)
Trade volume*Utilities	0.0293	0.0314
	(0.0223)	(0.0268)
Trade volume*Construction	0.0302*	0.0370*
	(0.0148)	(0.0168)
Trade volume*Manufacturing	0.0542*	0.0487*
	(0.0135)	(0.0144)
Trade volume*Wholesale Trade	0.0227	0.0034
	(0.0211)	(0.0218)
Trade volume*Transportation and Warehousing	0.0119	0.0061
	(0.0369)	(0.0355)
Trade volume*Information and Communications	0.0002	-0.0107
	(0.0293)	(0.0303)
Trade volume*Finance, Insurance, and Real Estate	0.0251	0.0166
	(0.0190)	(0.0194)
Trade volume*Professional, Scientific, and Management	0.0196	0.0149
	(0.0116)	(0.0095)
Trade volume*Educational, Health, and Social Services	-0.0081	-0.0093
	(0.0055)	(0.0063)
Trade volume*Arts, Entertainment, and Recreation	0.0462	0.0386
	(0.0294)	(0.0300)
Trade volume*Other Services	-0.0003	0.0006
	(0.0039)	(0.0036)
F(All county dummies jointly zero)		5.36
p-value		[0.0000]
F(All country dummies jointly zero)		16.09
p-value		[0.0000]
County Fixed Effects	No	Yes
Country Fixed Effects	No	Yes
N	25841	25841

[1] Regression results based on foreign-born immigrant workers aged 25 to 55 who came from a country that uses English as (one of) its official language(s) (Australia, Barbados, Canada, Ghana, Hong Kong, Ireland, Jamaica, New Zealand, Nigeria, Pakistan, Philippines, Sierra Leone, Union of South Africa, Thailand, Trinidad and Tobago, and the United Kingdom) with recorded bilateral trade volume between the United States and the respective country and who reside in a U.S. county where immigrant concentration data are available. Other regressors include dummy variables signifying educational attainment (whether the individual is a high school graduate, a college dropout, or a college graduate), age, gender, years since migration (and its squared term), race, a dummy variable set to unity for those who came before age 14, and marital status. County of residence and country of origin fixed effects dummies are included when applicable. *Trade volume* is defined as the sum of import and export between 1972 and 2001 between the United States and an individual's home country, as obtained from Feenstra (1996) and Feenstra, Romalis, and Schott (2002). This variable is standardized to have a zero mean with a standard deviation of one. Data sources: 5% IPUMS version of Census 2000; Feenstra (1996), Feenstra, Romalis, and Schott (2002).

[2] * signifies 5% statistical significance. Robust standard errors shown in parentheses.

Table 8: Summary Statistics

Variable	Observations	Mean	Standard Deviation
ln (wage)	139911	2.2599	0.7834
English	139911	0.9147	0.2794
Male	139911	0.5863	0.4925
Married	139911	0.5781	0.4939
Years since Migration	139911	14.9138	9.8669
High School Graduate	139911	0.2554	0.4361
College Dropout	139911	0.2064	0.4048
College Graduate	139911	0.2416	0.4280
White	139911	0.3247	0.4683
Age	139911	35.9530	9.8127
Child	139911	0.2348	0.4239
Human	139911	0.3905	0.4879
Percent Same Country	139911	-0.0060	0.9990
Percent Different Country	139911	0.0060	0.9990
Trade volume	139911	-1.50×10^{-8}	1
Percent Foreign Born	139911	-4.37×10^{-9}	1

[1] *Child* is a dummy variable that refers to immigrants who came before the age of 14.

[2] *Human* is a dummy variable set to unity for occupations that involve a heavier human-language-interaction. Details on the variable construction can be found in the Appendix.

[3] *Percent Same Country*, *Percent Different Country*, *Trade volume*, and *Percent Foreign Born* are all standardized to be mean zero with a standard deviation of one. *Percent Same Country* and *Percent Different Country* represent the proportion of individuals who came from the same or different country of origin compared to immigrant i, respectively. *Trade volume* refers to the sum of imports and exports between the United States and various country between 1992 to 2001, as provided in Feenstra's trade data set based on Feenstra (1996) and Feenstra, Romalis, and Schott (2002). Lastly, *Percent Foreign Born* signifies the percent of immigrant living in a certain county. Data sources: 5% IPUMS version of Census 2000; Feenstra (1996) and Feenstra, Romalis, and Schott (2002); Percentage of immigrants from respective countries who live in various counties in the U.S. is calculated using information obtained from *http://www.census.gov/qfd/states/*.

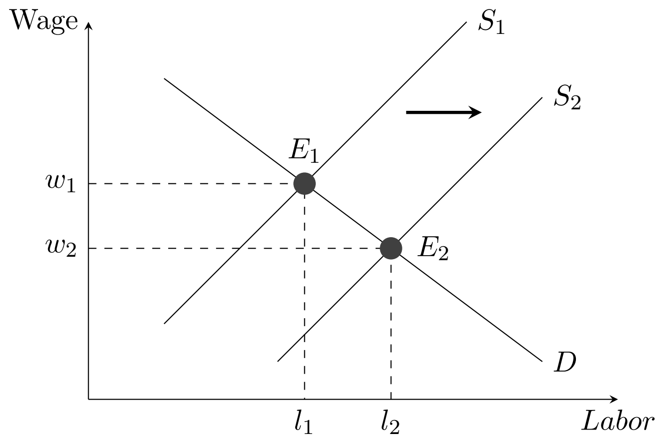

Figure 1: The effect of an increase in labor supply on equilibrium wages

When there is an increase in the number of immigrants who share the same language and cultural background, labor supply would shift out (from S_1 to S_2, meaning that the number of workers available for a certain job that requires a specific language and cultural skill would also increase (shown by l_2, compared to l_1). Holding demand constant, the equilibrium wage rate would go down from w_1 to w_2 as well.

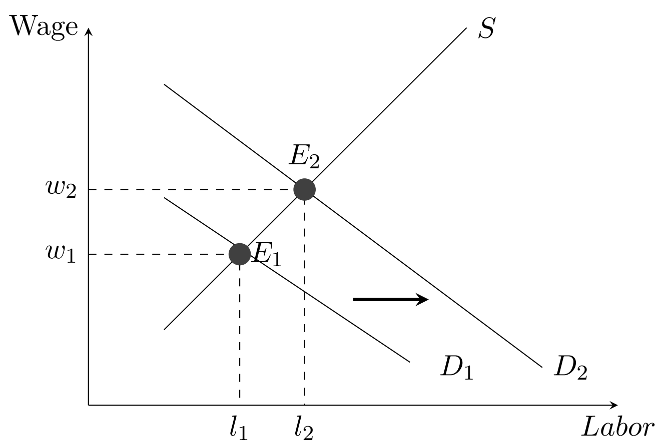

Figure 2: The effect of an increase in labor demand on equilibrium wages

However, when there are more workers who share the share language and cultural background available in the local labor market, their ability to communicate with other customers who share the same background could enable them to attract a larger customer base. In this case, labor demand would increase (shifting from D_1 to D_2). Holding labor supply constant, the equilibrium wage rate increase from w_1 to w_2, while the number of workers also increases from l_1 to l_2.

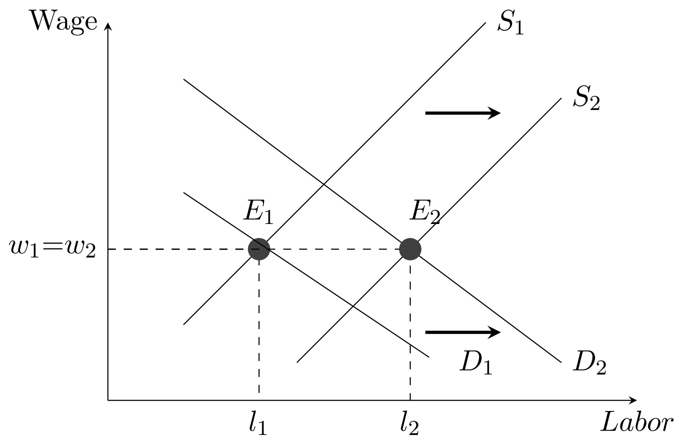

Figure 3: The effect of a simultaneous increase in labor demand and labor supply on equilibrium wages

When the effects demonstrated in Figures **??** *and* **??** *happen simultaneously, their effects on the equilibrium wage rate could become ambiguous. For example, as shown in the above graph, wages could remain unchanged (w_1=w_2). If the magnitude of labor supply shift is greater than that of labor demand (not shown), wages could decrease, and vice versa. As a result, having more immigrant workers who speak the same language and share an identical cultural background might increase, decrease, or carry no effect on the equilibrium wage offered in the labor market.*