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Offshoring, Immigration, and the Native Wage Distribution

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O¤shoring, Immigration, and the Native Wage Distribution

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Abstract

While workers in developed countries have become increasingly concerned about the impact o¤shoring and immigration have on their wages, the available evidence remains mixed. This paper presents a simple model that examines the impact of o¤shoring and immigration on wages and tests these predictions using U.S. state-industry level data. According to the model, the productivity e¤ect causes o¤shoring to have a more positive impact on low-skilled wages than immigration, but this gap decreases with the workers' skill level. The empirical results con…rm these predictions and thus provide the …rst evidence of the productivity e¤ect. Furthermore, the impact of o¤shoring and immigration on wages di¤ers depending on the income level of the foreign country, which may explain the mixed results in the literature.

Keywords: o¤shoring, outsourcing, immigration, productivity e¤ect, native wages

JEL Codes: F16, F22, J3

1 Introduction

try wage differences are captured by the immigrants rather than the domestic firms. Thus, comparing the impact of offshoring and immigration on the wages of native workers offers a unique opportunity to test for the presence of the productivity effect. Specifically, due to the productivity effect, offshoring has a more positive impact on low-skilled wages than immigration (Proposition 1), but this gap decreases with the workers' skill level (Proposition 2).

The predicted impact of immigration and offshoring on the wages of different types of native workers is then tested using a comprehensive U.S. state-industry level dataset. Using state-industry level data is appealing because it introduces a substantial amount of variation, it mitigates many of the mobility concerns associated with city or county level analyses, and it controls for compositional industry adjustments. The results confirm both predictions of the model. Offshoring has a positive effect on the wages of low-skilled workers while immigration has a slight negative effect on these wages. However, the impact of offshoring and immigration on wages converges as the workers' skill level increases.

Offshoring and immigration are then grouped according to the income level of the foreign country. This focuses attention on the types of offshoring and immigration that are best captured by the model, specifically the offshoring of low-skilled tasks to less-developed countries and the immigration of less-skilled workers from less-developed countries. The results again confirm both predictions of the model and provide even stronger empirical support for the productivity effect. Again, due to the productivity effect, offshoring has a more positive effect on the wages of low-skilled workers than immigration, but as the workers' skill level increases, the effect of offshoring and immigration on native wages becomes more similar.

While not the focal point of the model, offshoring to developed countries and immigration from developed countries are also included in the empirical analysis for comparison purposes. Interestingly, offshoring to developed countries decreases and

pared. Conflicting results in the literature typically arise from papers using different estimation strategies, unit of analyses, or data. However, this paper shows that off-

Hansberg (2008), I model o¤shoring as trade in tasks. The productivity e¤ect arises

O¤shoring L-tasks to the foreign country and immigration of L-workers to the home state are possible, while the o¤shoring of H-tasks and the immigration of H-workers are negligible.[5]

where s represents the high-skilled wage and a and a are functions of the relative average costs of the two sets of tasks. The first term on the right-hand side represents the costs paid to domestic low-skilled workers since (1 J) tasks are performed at home with a low-skilled labor needed for each task. The second term on the right-hand side represents the costs of hiring foreign low-skilled workers. Since the costs vary across each task, I integrate from 0 to J. The third term is the costs of hiring native high-skilled workers.

Substituting (1) into (2) yields the following zero-profit condition:

(3) $$P = (J)wa\ (\ w/s) + sa\ (\ w/s),$$

where

$$(J) = 1 \quad J + \left(\int_0 g(j)dj \right) / g(J).$$

Here the dependence of the factor intensities a and a on the relative average costs is explicitly stated. If $J = 0$, then no tasks are offshored, $(J) = 1$, and the zero-profit condition is of the standard form. Since $g'(j) > 0$, by the ordering of tasks, it can be shown that $(J) < 1$ as long as $J > 0$. Therefore, the costs to the firm after offshoring some tasks are less than if they chose to perform all L-tasks domestically. Finally, an increase in the share of low-skilled tasks that are offshored ($dJ > 0$) leads to a decrease in firms' costs ($d\ (J) < 0$).[6] Offshoring leads to a reduction in firms' costs through the extensive margin because more tasks are offshored and through the intensive margin because it is now cheaper to offshore the tasks already produced abroad.

[6] $\frac{\partial}{\partial J} = \frac{\int_0 g(j)dj}{g(J)^2} g'(J)$ which is negative when $J > 0$.

Domestic firms reduce their costs by optimally choosing the tasks to offshore.

supply which consists of native and immigrant workers.

Using the zero profit condition and the market clearing conditions, we can examine how an increase in offshoring or an increase in immigration affects domestic wages. Totally differentiating equation (3), assuming that P is the numeraire, yields[8]

$$(6) \qquad (\hat{w} + \hat{\ }) + (1 \qquad)L$$

side of (8) is the labor-supply effect of offshoring. As the cost of offshoring decreases (d < 0), more L-tasks are offshored ($dJ > 0$), and thus some low-skilled workers become unemployed. Due to excess supply, the wage of low-skilled workers declines. Together the first and second terms of equation (8) represent the impact of offshoring on the wages of low-skilled workers in this model. The third term on the right-hand side of (8) is the labor-supply effect of immigration. The excess supply of low-skilled workers due to immigration reduces the low-skilled wage. From equation (8), the following proposition is immediate:

Proposition 1 Due to the productivity effect, offshoring has a more positive impact on the wages of low-skilled workers than immigration.

While both offshoring and immigration generate a labor-supply effect, offshoring also generates a productivity effect that increases the wages of low-skilled workers. If the productivity effect exceeds the labor-supply effect, then offshoring will increase the wages of low-skilled workers. Thus, this model generates the seemingly counterintuitive result that offshoring can benefit the factor whose tasks are being sent abroad. Immigration, on the other hand, unambiguously decreases the wages of low-skilled labor in this model. Immigration does not generate a productivity effect because the benefits of country wage differences are captured by the immigrants rather than the domestic firm. Unlike offshoring, immigration does not generate any direct costs savings for domestic firms since they pay immigrants and native workers the same market wage.

Using (6) and (7), it is also possible to derive the percent change in the wage of high-skilled workers as a function of changes in offshoring and immigration:

(9)
$$\hat{s} = - \frac{dJ}{(1 \quad J)} + - \frac{dI}{(1 + I)}.$$

Here the labor-supply effect of offshoring and immigration increases the wages of high-skilled workers. As is common in a two factor model, an increase in the effective supply of low-skilled labor increases the marginal product and wages of high-skilled workers. Offshoring does not generate a productivity effect for high-skilled workers because a decrease in the costs of offshoring ($d < 0$) reduces the firms' costs of performing L-tasks with no direct effect on the costs of performing H-tasks. Thus, offshoring does not directly impact the productivity of high-skilled workers. Comparing equations (8) and (9) establishes the following proposition:

Proposition 2 Due to the productivity effect, the impact of offshoring and immigration on wages becomes more similar as the workers' skill level increases.

The labor-supply effects generated by offshoring and immigration have a negative impact on low-skilled wages and a positive impact on high-skilled wages. However, the productivity effect generated by offshoring only impacts low-skilled wages since offshoring affects the costs of performing L-tasks but not H-tasks. Thus, offshoring and immigration differ in their impact on low-skilled wages but have a similar impact on high-skilled wages.

3 Estimation Strategy

The propositions generated by the model offer two unique, testable predictions for the productivity effect. Offshoring will have a more positive impact on low-skilled wages than immigration (Proposition 1), but this gap decreases with the workers' skill level (Proposition 2). The empirical analysis that follows will test these predictions by estimating the ilwd[(b)38(y)-354611(s)8(,)-327(o)10(¤)104(s)8(h)11(o)11(r)11(i5295(T)15(h)4611(

workers) that are envisioned in the model. Focusing on offshoring to less-developed countries (i.e. L-tasks) and immigration from less-developed countries (i.e. L-workers) provides a good proxy for these components of interest. Thus, the following equation will be estimated:

$$(11) \quad W = {}_0 + {}_1 Off\_lessdev + {}_2 Off\_dev + {}_3 Img\_lessdev$$
$$+ {}_4 Img\_dev + {}_5 X + \; + \; + \; + \; .$$

Again the model predicts that ${}_1 > {}_3$ for low wage deciles but that the difference between ${}_1$ and ${}_3$ decreases as the native wage deciles increase.

Offshoring to less-developed countries takes advantage of low foreign wages by relocating particular low-skilled tasks abroad. This is the type of offshoring that is envisioned in the model and entails different tasks being performed by domestic and foreign low-skilled workers. Since native and foreign workers are complements in the production process, it is more likely that the productivity effect exceeds the labor-supply effect, and thus the impact on low-skilled native wages will be positive. On the other hand, offshoring to other developed countries tends to be motivated by the desire to access foreign markets by replicating the production process abroad rather than exporting. While this is not the type of offshoring that is discussed in the model, the concepts of the productivity and labor-supply effects are still relevant. This type of offshoring consists of similar tasks being performed by domestic and foreign workers. Since foreign workers are substituting for domestic workers, the labor-supply effect likely exceeds the productivity effect, and thus the impact on low-skilled native wages will be negative.[9]

[9] This is consistent with Harrison and McMillan's (2006) findings that vertical foreign affiliate employment complements domestic employment whereas horizontal foreign affiliate employment substitutes for domestic employment.

Consistent with previous results (Borjas 1995), I find that the skill level of immigrants is strongly correlated with the income level of the foreign source country.[10] Since immigrants from less-developed countries are relatively less skilled, they will compete with less-skilled native workers for jobs. Thus, according to the model, immigration from less-developed countries generates a labor-supply effect that depresses low-skilled wages and increases high-skilled wages. Although the model focuses on less-skilled immigrants, the effects of skilled immigrants from developed countries will be included in the empirical analysis for comparison purposes. If these skilled immigrants bring knowledge and expertise that is not readily available in the domestic labor market, they may raise the wages of all types of native workers.

4 Dwe

eign a¢ liates of U.S. ...rms, is obtained from the U.S. Bureau of Economic Analysis (BEA).[12] Given the trade in task model, focusing on foreign a¢ liate employment is preferable to other measures of foreign direct investment such as a¢ liate sales. The BEA provides foreign a¢ liate employment data by year and industry of the foreign a¢ liate. Since o¤shoring data is not available by state, foreign a¢ liate employment is distributed across states based on the share of state GDP to national GDP in that industry. Finally, the share of foreign a¢ liate employment to total employment, including both domestic and foreign employment, is calculated by state, industry, and year. Thus, o¤shoring is de...ned as the following share

$$offshoring = \frac{\left[\sum_{s} \frac{sit}{sit} \; Foreign\_Affiliate\_Empl\right]}{Domestic\_Empl + \left[\sum_{s} \frac{sit}{sit} \; Foreign\_Affiliate\_Empl\right]} \; 100,$$

where s indexes states, i indicates industries, and t references years. This measure of o¤shoring is consistent with J from the /F2111.955Tf12u9(h)]TJ/Fwd(eiho)11ecasur991(i)6(s)-284(t)8 is preferable to a cross country analysis where it is difficult to control for unobserved factors. Since U.S. states share similar laws, institutions, and cultural characteristics, using states as the unit of analysis limits these confounding factors. Together with the variation in offshoring and immigration across states (Table 1), this means that the link between these forms of globalization and wages is more easily identified. In addition, state level data mitigates many of the mobility concerns associated with a city or county level study. Thus, states more closely resemble a closed labor market while still offering a substantial amount of variation.

Second, this analysis incorporates 14 2-digit NAICS industries which range from manufacturing to professional services to finance (Table 2). Due to data constraints, many previous studies focus just on manufacturing industries (Feenstra and Hanson 1999, Harrison and McMillan 2006, Amiti and Wei 2009). However, manufacturing represents only 13% of total U.S. GDP in 2008.[14] Unlike these previous studies which focus on a small component of the U.S. economy, this analysis examines how offshoring and immigration affect wages in a wide variety of industries. Furthermore, by focusing on highly aggregated NAICS industries, mobility across industries is less problematic.

Incorporating 14 industries into this analysis not only provides an additional source of variation but it also controls for the compositional mix of industries within states. It is possible that an influx of immigrants or an increase in offshoring could lead to a change in industry composition within a state. Specifically, a labor supply shock can be fully absorbed through a change in industry mix without any change in factor returns. By using a state-industry-year unit of observation, this analysis controls for the changing compositional mix of industries within states. Finally, the years included in this analysis span exogenous shocks to both offshoring and immigration caused by China joining the World Trade Organization in 2001 and changes

[14] Gross Domestic Product by Industry Accounts (BEA).

to immigration policy following 9/11.

Table 1 presents the median wage, immigration, and offshoring by state. While the state fixed effects will capture much of this variation, Table 1 provides insight into the states that are most susceptible to offshoring and immigration. There is substantial variation across states, with the median wage ranging from $23,721 in Montana to $41,595 in Connecticut, immigration fluctuating from 1.6% in West Virginia to 34.3% in California, and offshoring varying from 3.2% in Montana to 9.0% in Indiana. Figure 1 plots average immigration and offshoring by state. Not surprisingly, the urban coastal states of California, New York, and New Jersey have high shares of offshoring and immigration while the rural isolated states such as Montana and North Dakota have low shares of both. Florida and Nevada have high shares of immigration on state, industry, and year …xed e¤ects. The residuals from these regressions will be brackets. We see that globalization leads to an increase in wages of all types of native workers, thus contradicting many of the fears of American workers. A protectionist policy that limited o¤shoring, immigration, and inshoring would unambiguously decrease the wages of native workers. While Table 3 demonstrates that these forms of globalization, on the whole, bene…t native workers, the model predicts that o¤shoring and immigration should di¤er in their impact on the wages of native workers. Next, the aggregate e¤ect of o¤shoring and immigration on native wages is examined, while the subsequent section focuses on the types of o¤shoring and immigration that are most similar to those considered in the model.

importance of controlling for the income level of the foreign country.

results in Table 4.

While the model focuses on the o¤shoring of low-skilled tasks and the immigration of low-skilled workers, I include o¤shoring to developed countries and immigration from developed countries in the regressions in Table 5 for comparison purposes. O¤-shoring to other developed countries entails replicating the production process abroad in order to access foreign markets and avoid transport costs. This results in foreign workers substituting for domestic labor and explains the negative coe¢ cients on results in Table 6 are consistent in sign, magnitude, and significance level to those reported in the baseline results in Table 5.

Second, local wages are unlikely to be a driving force in the state location decision of immigrants. Non-economic factors such as family and friends, distance from home country, and weather are typically found to be important determinants of immigrant location decisions.[16] The migration of residents in response to wages is more problematic at a more finely disaggregated geographic level (i.e. cities or counties) or across more finely disaggregated industries (i.e. 6-digit NAICS). However, for the sake of argument, suppose immigrants did choose states and industries solely based on which paid a relatively higher wage. Then there would be a spurious positive correlation between immigration and wages. The fact that the Immigration (Less Dev) coefficients in Table 5 are significantly negative implies that either this positive bias is negligible or the impact of immigration on domestic wages is even more negative rather than a productivity effect as this paper proposes.

To address these concerns, I include the average educational attainment of the native population as a control in all the regressions presented in this paper. This will capture changes in the average skill level of native employees and thus any compositional shifts in employment will be controlled. The results indicate that native educational attainment is an important control variable. However, there is still an important relationship between offshoring, immigration, and wages which is not driven

7 Conclusion

Americans have become increasingly concerned about the impact o¤shoring and immicertain components of offshoring and immigration can depress the wages of specific types of native workers. Policy makers, whose goal is to increase the wages of native

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FIGURE 1
IMMIGRATION AND OFFSHORING BY STATE

State average of the share of employees that are foreign born and the share of employees that work abroad weighted by the sample size.

TABLE 2
INDUSTRY AVERAGES

Industry	Median Wage	Immigration	Offshoring
Agriculture, Forestry, Fishing, Hunting, and Mining	$31,256	16.5	4.7
Utilities	$48,742	5.4	9.4
Construction	$33,957	14.9	0.3
Manufacturing	$38,097	14.2	21.2
Wholesale Trade	$36,740	12.6	10.6
Retail Trade	$24,030	10.7	3.4
Transportation and Warehousing	$37,735	11.4	2.6
Information	$41,728	10.2	7.9
Finance and Insurance	$38,889	9.6	3.5
Real Estate, Rental, and Leasing	$31,663	12.6	0.9
Professional, Scientific, Techinical Services and Management	$46,766	12.8	3.6
Administration and Waste Services	$24,730	18.4	4.9
Health Care and Social Assistance	$28,324	11.6	0.1
Accomodations and Food Services	$15,433	22.7	3.8

Industry average of the median native wage, the share of employees that are foreign born, and the share of employees that work abroad weighted by the sample size.

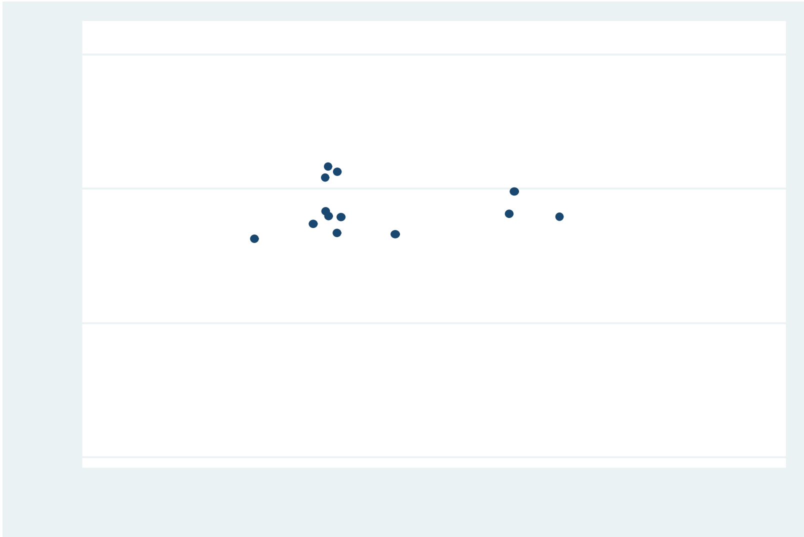
FIGURE 2

MEDIAN WAGE AND OFFSHORING

The residuals from regressing the ln native median wage on state, industry, and year fixed effects are plotted against the residuals from regressing offshoring on state, industry, and year fixed effects.

FIGURE 3

MEDIAN WAGE AND IMMIGRATION



The residuals from regressing the ln median native wage on state, industry, and year fixed effects are plotted against the residuals from regressing immigration on state, industry, and year fixed effects.

TABLE 3

	ln(Wage 10th%)	ln(Wage 20th%)	ln(Wage 30th%)	ln(Wage 40th%)	ln(Wage 50th%)	ln(Wage 60th%)	ln(Wage 70th%)	ln(Wage 80th%)
Globalization	0.002***	0.002***	0.001***	0.001***	0.002***	0.002***	0.002***	0.002***
	[0.001]	[0.001]	[0.000]	[0.000]	[0.000]	[0.000]	[0.000]	[0.000]
Age	0.004	0.004	0.004	0.003	0.002	0.002	0.003	0.003
	[0.004]	[0.003]	[0.002]	[0.002]	[0.002]	[0.002]	[0.002]	[0.002]
Education	0.166***	0.170***	0.180***	0.187***	0.198***	0.207***	0.216***	0.237***
	[0.013]	[0.009]	[0.008]	[0.007]	[0.007]	[0.007]	[0.007]	[0.011]
Male	0.010***	0.010***	0.009***	0.010***	0.010***	0.010***	0.010***	0.010***
	[0.001]	[0.001]	[0.000]	[0.000]	[0.000]	[0.000]	[0.001]	[0.001]
Black	0.000	0.001*	0.002***	0.002***	0.002***	0.002***	0.001**	0.000
	[0.001]	[0.001]	[0.000]	[0.000]	[0.000]	[0.000]	[0.000]	[0.000]
Asian	0.014**	0.022***	0.017***	0.017***	0.016***	0.019***	0.020***	0.021***
	[0.006]	[0.004]	[0.004]	[0.004]	[0.004]	[0.004]	[0.004]	[0.005]
Hispanic	-0.006***	-0.005***	-0.004***	-0.004***	-0.004***	-0.004***	-0.004***	-0.003***
	[0.002]	[0.001]	[0.001]	[0.001]	[0.001]	[0.001]	[0.001]	[0.001]
Married	0.000	0.000	0.000	0.001	0.001**	0.002**	0.002***	0.002**
	[0.001]	[0.001]	[0.001]	[0.001]	[0.001]	[0.001]	[0.001]	[0.001]
Single	-0.007***	-0.006***	-0.005***	-0.005***	-0.004***	-0.004***	-0.003***	-0.002**
	[0.002]	[0.001]	[0.001]	[0.001]	[0.001]	[0.001]	[0.001]	[0.001]
Observations	4032	4032	4032	4032	4032	4032	4032	4032
R-squared	0.91	0.95	0.96	0.96	0.96	0.96	0.96	0.95

ln(Wage 10th%)

ln(Wage 20th%)

ln(Wage 10th%)

	ln(Wage 10th%)	ln(Wage 20th%)	ln(Wage 30th%)	ln(Wage 40th%)	ln(Wage 50th%)	ln(Wage 60th%)	ln(Wage 70th%)	ln(Wage 80th%)
Offshoring (Less Dev)	0.041***	0.033***	0.025***	0.019***	0.017***	0.014***	0.009**	0.002
	[0.007]	[0.005]	[0.004]	[0.004]	[0.004]	[0.004]	[0.004]	[0.005]
Offshoring (Dev)	-0.025***	-0.019***	-0.015***	-0.010***	-0.009***	-0.005*	-0.001	0.003
	[0.006]	[0.004]	[0.003]	[0.003]	[0.003]	[0.003]	[0.003]	[0.004]
Immigratio[0.005]								

	ln(Wage 10th%)	ln(Wage 20th%)	ln(Wage 30th%)	ln(Wage 40th%)	ln(Wage 50th%)	ln(Wage 60th%)	ln(Wage 70th%)	ln(Wage 80th%)
Offshoring (Less Dev)	0.039***	0.032***	0.027***	0.021***	0.017***	0.016***	0.007	0.006
	[0.009]	[0.007]	[0.006]	[0.005]	[0.005]	[0.005]	[0.005]	[0.005]
Offshoring (Dev)	-0.022***	-0.020***	-0.015***	-0.011***	-0.007*	-0.006	0.000	-0.001

A Model Appendix

A.1 Deriving Equation (6):

Total di¤erentiating equation (3), assuming that P is the numeraire, yields:

$$0 = d \quad wa \quad + dw \quad a \quad + da \quad w + dsa \quad + da \quad s$$

or:

$$0 = \hat{} \quad + \hat{w} \quad + \hat{a} \quad + \hat{s} \quad + \hat{a}$$

where and are the cost shares of low-skilled and high-skilled labor (and + = 1). Since pro…t maximizing …rms have minimized costs, $\hat{a}$ = 0 by the envelope theorem. Thus:

$$(6)\ 0 = \quad (\hat{} + \hat{w}) + (1 \quad)\hat{s}$$

A.2 Deriving Equation (7):

Totally di¤erentiating the ratio of (4) to (5) gives:

$$\frac{L}{H}\left(\frac{\Omega}{} + \frac{\Omega}{} \quad \frac{\Omega}{^2}\right) \quad \frac{L \quad H}{^2_H}\left(\frac{\Omega}{} + \frac{\Omega}{} \quad \frac{\Omega}{^2}\right) = \frac{(1+\ )}{(1-\ )} + \frac{}{(1-\ )} \quad \frac{(1+\ )}{^2(1-\ )} + \frac{(1+\ )}{(1-\ )^2}$$

or:

$$\frac{L}{H}(\hat{a} \quad \hat{a}\ )\left(\frac{\Omega}{}\right)\left(\hat{w} + \hat{} \quad \hat{s}\right) = \frac{(1+\ )}{(1-\ )}\left(\hat{L} + \frac{}{(1+\ )} \quad \hat{H} + \frac{}{(1-\ )}\right)$$

The …rst terms on each side cancel following from the ratio of (4) to (5) and since the native factor supplies are …xed then $\hat{L} = \hat{H} = 0$. Therefore:

$$(\hat{a} \quad \hat{a}\ )\left(\frac{\Omega}{}\right)\left(\hat{s} \quad \hat{w} \quad \hat{}\right) = \frac{}{(1+\ )} + \frac{}{(1-\ )}$$

or:

$$(7) \quad \left(\hat{s} \quad \hat{w} \quad \hat{}\right) = \frac{}{(1+\ )} + \frac{}{(1-\ )}$$

where the elasticity of substitution is de…ned as:

$$= \frac{\frac{a_H}{a_L} \quad \frac{a_H}{a_L}}{\left(\frac{w}{s}\right) \left(\frac{w}{s}\right)} = \frac{(\hat{}_H - \hat{}_L)(\ \Omega\ )(\hat{} + \hat{\Omega} - \hat{})}{(\hat{} + \hat{\Omega} - \hat{})} = (\hat{a} \quad \hat{a}\ )(w \ = s)$$

A.3 Deriving Equation (8):

Rearranging equation (7) as follows:

$$\hat{s} = \frac{}{(1-\ )} + \frac{}{(1+\ )} + \hat{w} + \hat{}$$

and plugging this into equation (6) yields:

$$(\hat{w} + \hat{}) + (1 \qquad) \left[\frac{}{(1-\ )} + \frac{}{(1+\ )} + \hat{w} + \hat{} \right] = 0$$

or:

$$(8)\ \hat{w} = \quad \hat{} \quad \frac{(1-\ _L)}{}\frac{}{(1-\ )} \quad \frac{(1-\ _L)}{}\frac{}{(1+\ )}$$

A.4 Deriving Equation (9):

Rearranging equation (7) as follows:

$$\hat{w} = \quad \frac{}{(1-\ )} \quad \frac{}{(1+\ )} + \hat{s} \quad \hat{}$$

and plugging this into equation (6) yields:

$$\left[\quad \frac{}{(1-\ )} \quad \frac{}{(1+\ )} + \hat{s} \right] + (1 \qquad)\hat{s} = 0$$

or:

$$(9)\ \hat{s} = \frac{}{L}\frac{}{(1-\ )} + \frac{}{L}\frac{}{(1+\ )}$$

B Data Appendix

B.1 Data Sources

Individual level data was obtained from the 2000 1% Census sample and the 2001-2005 American Community Survey (ACS) via IPUMS. The 2000 1% sample was preferable to the 2000 ACS because it was approximately seven times the size (the 2000 observations by state in these industries. Thus, the analysis includes 14 NAICS industries. Finally, available Census and BEA data restricts the sample to the years 2000-2005.

B.3 Definition of Developed

The countries with the highest 2006 GDP per capita according to the World Development Indicators database (World Bank, April 11, 2008) were Canada, Denmark, Finland, Iceland, Norway, Sweden, UK, Ireland, Belgium, France, Luxembourg, Netherlands, Switzerland, Italy, Austria, Germany, Japan, and Australia (not including San Marino or the U.S.). Immigrants that were born in these 18 countries were assigned to the Developed group, while those immigrants born in the remaining countries were assigned to the Less-Developed group. Offshoring to developed countries includes foreign affiliate employment in Europe, Canada, Australia, and Japan, while offshoring to less-developed countries consists of the remaining foreign affiliate employment. Unfortunately data limitations do not allow "Europe" to be broken into individual countries that correspond to those included in the immigrant definition. However, of the total foreign affiliate employment in Europe, 85% is going to the 14 European countries included in the immigrant Developed group.

B.4 Missing Values

Due to confidentiality concerns, the BEA withholds some industry-country specific foreign affiliate employment numbers. There are no missing values for total foreign affiliate employment, but when constructing offshoring to developed and less-developed countries, this issue needs to be addressed. Data for these 18 missing values are filled with the industry-country average across years. The majority of the time this average falls within the employment range indicated by the BEA for that employment cell; when it does not, I replace the missing value with the midpoint of this range instead.