THE EFFECT OF IMMIGRATION ON ETHNIC COMPOSITION AND OCCUPATIONAL REALLOCATION

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November 11, 2009

Abstract

Over the last 30 years, the U.S. labor market has been transformed by the 'second great migration'. Much of this immigration has been among the lower skilled; the share of High School Dropout (HSD) workers who are foreign born increased from 12% in 1980 to 44% in 2007. At the same time, native born HSD workers grew more slowly than any other educational category, falling by nearly 6%. These two outcomes have inevitably lead to much speculation that immigrants depress the wages of similarly skilled natives. The labor economics literature, however, has found little empirical evidence to support this claim. We aim to assess whether the impact of immigration is mitigated by occupational transition of natives. Being over represented among HSDs, we focus on the labor market outcomes for Black workers. We use data from the 5% public use sample of the census(1980, 1990 and 2000) as well as the 1% sample of the population from the American Community Survey (2005, 2006 and 2007) to estimate the effect of occupational reallocation on the wages of Black workers as well as the effect of immigration on reallocation. A shift-share analysis reveals that occupational transitions caused wages for Blacks to raise by 46% more than they would have with a static occupational distribution. However, we find that these occupational shifts were due to crowding out effect of Hispanics on Black occupations: a 10 percentage point increase in the share of workers in an occupation who are Hispanics leads to a 5 percentage point decrease in the share of Black workers in that occupation. This is significantly large to explain substantially occupations that declined in importance for Blacks during the period of study. We find a strong correlation between importance of occupations to Hispanics and Blacks, suggesting that most occupational transition for these two groups has not only been driven by outside factors such as trade and

technological change, but that these shocks are affecting the two groups similarly.

Preliminary draft, please do not cite. Comments are welcome

(Research has been supported by a grant from the University of California Institute for Mexico and the United States (UCMEXUS) and by the Ford Foundation. All remaining errors and omissions are our own.

1 Introduction

Over the last 30 years, increased immigration has been one of the key factors characterizing labor markets in the United States. The foreign born adult population has increased from 9% in 1980 to over 17% in 2007. This immigration has not been skill neutral. We see in Table 1 that the share of High School Dropout (HSD) workers who are foreign born has increased from 12% in 1980 to 44% by 2007. At the same time, we see in Table 2 that the wages of HSD workers have declined (both in absolute terms and when compared to other skill groups). Has this increase in low skilled immigration contributed to the decline in the wages of native low skilled workers?

The answer to these questions remain unclear, and the literature has typically found moderate to no effects of immigration on natives' wages (see Table 3). There are two potential factors that determine the impact on wages paid to native workers. The first is the degree of substitutability between a native-born and a foreign-born worker in performing particular productive tasks (i.e. will immigration affect occupational wages). The second is whether native workers respond to immigration by shifting occupations (i.e. does labor supply respond to these changes in occupational wages).

Here, we shed some light on the second question by examining whether occupational transitions may affect the labor market outcomes of native workers, and to what extent these shifts can be attributed to immigration. We focus primarily on Black workers, as this group is over represented among HSD workers (14% of that group in 1980 while only 10% of the total population) and has often been posited as a group likely to be affected by low skilled immigration. We first perform a shift-share analysis to see how changes in Blacks' occupations have affected their wages. We then analyze correlations between the *occupational importance* (share among all Blacks who work in an occupation) and *occupa-*

tional concentration (share of workers in an occupation who are Black) and the *occupational concentration* of Hispanic workers. We find that occupational changes had a major impact on the wages of Black's, but that little of these changes in the occupational distribution of Black workers can be attributed to competition with Hispanic workers. Rather, our results are suggestive that most occupational shifts during this period were due to changes in labor demand that affected both groups similarly in magnitude. In other words, there were some occupations which saw a decrease in demand for workers in general. For example manufacturing might see a drop in demand for workers since a lot of manufacturing is being done outside the U.S.

The rest of the paper proceeds as follows. Section 2 reviews the relevant literature, section 3 describes the data, section 4 discusses the simple regression model used and the counterfactual wage analysis, section 5 discusses the results, and section 6 concludes and discusses scope for future work.

2 Lit Review

A seminal paper in the immigration literature was Card's (1990) paper. Using the impact of an exogenous shock (the Cuban government relaxing the restriction on outmigration) to identify the effect of immigration on wage and unemployment rates of less-skilled workers, he finds little evidence of adverse effects. The influx of Cubans in the early 1980s increased Miami's labor force by 7%. Surprisingly, the study found that the influx of Mariel immigrants had virtually no effect on the wages of less-skilled non-Cuban workers. Further, there was no increase in unemployment rates among the non-Cuban or Black workers. Rather it seemed that Miami's labor market was able to absorb the excess workers without changing either the wage rates or unemployment levels. This study spurred a number of other papers based on similar exogenous variations.

Kugler & Yuksel (2008) also found no wage effects on low skilled natives using a massive outmigration from Central America due to the Hurricane Mitch. Their OLS results showed that native wages are positively related to the recent influx of Latin Americans. However after controlling for out-migration, the native wage effect disappears and less-skilled employment of previous Latin American immigrants fall. Friedberg (2001) looks at the increased immigration to Israel after emigration restrictions were lifted in an unstable Soviet Union. Using least square estimates, she finds that occupations that employed more immigrants had lower native wage and employment growth compared to the others. However since this distribution of immigrants across occupations was not independent of relative labor market conditions, she re-estimates her results using an Instrumental Variable approach and finds that she cannot reject the hypothesis that mass migration of Russians to Israel did not affect the earnings or employment of native Israelis. Other papers using exogenous variations include those by Butcher & Card (1991) and Angrist & Kugler (2003).

More recently there has been a growing literature which looks at the mechanism through which immigration effects native wages. The paper by Peri & Sparber (2009) provides theoretical and empirical evidence that natives will change the occupations to which they supply their labor in response to immigration. They argue that production involves different labor skills. While less educated immigrants have a comparative advantage in manual and physical tasks, they have a disadvantage when it comes to communication and language intensive skills. Natives (with similar education levels) on the other hand have a comparative advantage in communication skills. Differences in skills lead to differences in specialization by immigrants and native-born workers. An increase in the supply of immigrants for manual tasks leads to a gradual shift by natives into language intensive jobs. This may either raise the return to communication

skills, or partially offset a negative effect.

Peri & Sparber (2009) find evidence that less-educated immigrants are more likely to work in a manual job compared to a job which involved more communication skills. States which had a larger flow of less educated immigrants saw a higher transfer of natives from manual to communication tasks. This led to lower wages in manual task intensive occupation and a higher supply of natives in occupations demanding language skills. As a result, the wage loss (due to a shift in occupation by native workers) was much smaller than what was predicted by the model in which natives and immigrants were perfect substitutes. They also find that immigration of less-educated workers only reduces average real wages paid to less educated US-born workers by 0.2% between 1990 and 2000. Had there been no task specialization, the wage loss would have been 1.2%

A paper by Peri & Ottaviano (2007) analyzes the impact of immigrants on not only labor markets but also on the housing market. Using instrumental variables, they look at the effect of immigrant on wage, prices and rents for the average native as well as across native skill groups. A combination of regression and simulation approach leads to two novel results. First, there is a strong positive correlation between immigration and housing prices. Second, the effect of wages and rents for native workers of different educational levels. For low skilled workers, there is a small negative wage effect from immigration but a small positive rent effect (the positive house value effect compensates for the negative wage effect). In the case of more skilled workers, the effect of immigrants is positive on both wages and housing prices. Since most workers in this category own a house, in the long-run, immigration has a strong positive effect on such worker's incomes.

In addition to the immigration literature, we also build on work done on oc-

cupational transition. A paper by Autor & Dorn (2008) describes a more than 50% rise in the share of hours worked in service occupations between 1980 and 2005 among workers with high school or lower education. Real hourly wages also increased by 20 log points in the same service occupations, exceeding wage growth in other low-skill occupations. They hypothesize that the rise in demand for service work is due to changes in task specialization induced partly by technical changes. They argue that primary job tasks of service occupations are difficult to automate or outsource since they require interpersonal and environmental adaptability as well as direct physical proximity. This in turn does not allow for substitution in outputs of service occupation, leading to rising wage and employment in service occupation.

Autor & Dorn (2008) study the determinants of employment and wages in services from 1950 to 2005 in 722 commuting zones in the US. They compare and contrast the period from 1980 to 2005 (during which rapid adoption of information technology took place) with a previous period from 1950 to 1980. They argue that if commuting zones differ initially in their share of employment in routine-intensive occupations, markets with higher routine share will see larger increases in service occupation employment and greater polarization of earnings between high and middle-skill worker as time progresses. Assuming goods and services are sufficiently complementary, their model implies that wages in service occupations will rise along with service employment. Their results show that there is reallocation of labor activity in response to exogenous shocks (technology, in their case). All of these papers point towards a process of employment and wage polarization within regional labor markets.

While a number of studies find moderate to no effect of immigration on native's wages, we add to the existing literature by examining whether native workers respond to immigration by shifting occupations. In other word we

examine if the occupational distribution of Black workers is important in terms of their wages? And can "crowding out' types of effects explain some of the change in occupational distribution of Black workers.

3 Data and Summary Statistics

The primary sources of data for this study is the 5% public use sample of the decennial census (1980, 1990 and 2000) and the 1% sample of the population from the American Community Survey (2005, 2006 and 2007). Table 4 shows the summary statistics of the variables used in the analysis. Table 5 shows the most common occupations in the sample. Our wage data trims the top and bottom 5% of the wages from the sample. Trimming took care of outliers and measurement error in usual hours and weeks worked. We restrict the data to include only workers in the age group of 18 to 64, both inclusive. Local labor markets are constructed using the Community Zones (CZ) approach. In 1990 the Census Bureau partitioned (based on cross county commuting flows) all counties in the United States into commuting zones. CZs were first used by Autor & Dorn (2008) for defining local labor markets. We prefer to use CZs for the following two reasons. First, unlike the Metropolitan Statistical Areas (MSA) which include only urban counties, the CZs include all counties in the US. This gives us a fuller range of local variation than is possible with MSA-based units. Second, the definition of CZ is based on the actual degree of integration of the local labor market across counties. This is useful because these areas are not only contiguous, they are also linked with each other by an economically meaningful criterion.

Using the most recent (1990) definitions of CZs, we map counties consistently onto CZs over time. The Public Use Micro Data (PUMA) is the most local geography identified in the 1990 and 2000 census as well as the ACS. A PUMA

is a sub-state area which usually comprises a population of 100,000 to 200,000 individuals. In most cases, the PUMA can be matched to a unique county and hence to a unique CZ. In some (especially rural) areas PUMAs span over several counties but never over multiple states. In such cases, we assign residents of these PUMAs to several CZs. Sample weights of individuals assigned to multiple CZs are then adjusted to reflect the relative share of a CZs population in a particular PUMA. While our data includes all Hispanics in the population, we did re-run out analysis using just Hispanic immigrants and got very similar results.

In Tables 6 through 9, we begin to look for evidence of competition between Blacks and Hispanics in the labor market. We begin by looking at the largest occupations (occupations with the largest percentage of Black workers) for Black workers in both 1980 and 2007. In Table 6, we see that these were (1) Freight and Stock workers, (2) Nursing Aides and Orderlies and (3) Janitors. These occupations employed 5.9%, 4.25% and 4.2% of Black workers, respectively. Looking forward to 2007, Table 7 shows that the importance of these occupations to the Black labor force changed significantly over time. Freight and Stock workers were now the 4th largest occupation and employed only 3.6% of Black workers. Nursing Aides and Orderlies were now the largest occupation, employing 6.1% of this group, and Janitors had fallen from 4.2% of employment to 2.6% of employment. A further look at wages for these occupations show that not only did the percentage of Blacks working as Freight and Material Handlers drop from 1980 to 2007, their corresponding wages also fell from $13.46 an hour to $12.84 an hour for Blacks. Nursing Aide and Orderlies saw an increase in the wage of Black workers while Black Janitor's wage dropped marginally over the same period.

We then turn to Table 8 to see if there is any evidence that these changes in

occupational importance may be negatively correlated with employment growth for Hispanics in these same occupations. We see that Freight and Stock workers was the occupation that experienced the second largest decline over this period. However, the occupation declined in strikingly similar magnitudes for Hispanics also. Janitors faced the 5th largest decline for Blacks but grew slightly for Hispanics, consistent with a story of task re-specialization. Of these most declining occupations, we see that 8 of them declined for Hispanics as well. While the two occupations that moved in opposite directions for the two groups (Janitors and Housekeepers) are consistent with task re-specialization, this is the some preliminary evidence that the bulk of occupational transition is driven by outside factors that affect both Black and Hispanic workers, rather than competition between the two groups on the labor supply side. Nursing Aides and Orderlies do not show up in this table, as it is an occupation that grew during this period. But comparing the second columns of Tables 5 and 6, we can see that this occupation increased in importance for Hispanics as well as Blacks.

Table 9 shows us the wage change for Black occupations which decreased the most (as discussed above). Machine operators which saw the largest drop in Black and Hispanic workers also had a moderate decline in Black and Hispanic wages. Freight and Material Handlers saw the biggest drop in wages for both Blacks and Hispanics. What was interesting to see was that while Blacks workers as Janitors dropped in numbers (and Hispanic increased) the wage change was in the opposite direction. Wage of Black janitors increased while those of Hispanic janitors fell.

4 Empirical Model

In the last section, we looked to see if there was some preliminary evidence consistent with occupation reallocation. We define occupation reallocation as the

shift (or reallocation) of occupations by a race. For example, if Blacks shift their occupation from being Janitors to Truck drivers due to either fall in wages in that occupation or due to higher competition from Hispanics, we would consider this as occupation reallocation. In this section we describe the empirical tools we will use to rigorously test for occupation reallocation. First, we motivate the importance of occupational reallocation through a shift share analysis. After finding how occupational re-allocation affects wages, we then turn our attention to correlating changes in occupational importance and concentration between Black and Hispanic workers to see if some of the Black occupational reallocation (and associated wage changes) can be attributed to immigration. In other works, we seek to answer two questions:

1. Has change in the occupational distribution for Black workers been important in terms of their wages?

2. Can we explain some of the change in the occupational distribution with "crowding out' types of effects?

To answer the first question, we analyze how wages have changed at the occupational level and how this change has affected overall wages. To do this, first find the average wage for Black workers in 1980. Essentially, this is finding a weighted average of occupational wages for this group, where weights are the share of the group employed in each occupation. Denote this by $\overline{Y80}$. The corresponding value for 2007 is denoted by $\overline{Y07}$. Finally we construct a counterfactual average wage for 2007, taking a weighted average of occupational wages using 1980 occupational wages. We denote this as $\overline{Y07^o}$. The difference between $\overline{Y07^o}$ and $\overline{Y80}$ shows us how much the average wage would have changed if the group's labor supply would not have changed at all between occupations. This change in wages is thus attributable only to changes in occupational wages and not to the changing occupational distribution of workers (the *within* estimate).

Similarly by comparing $\overline{Y07}$ with $\overline{Y07^o}$, we obtain a *between* estimate, i.e. how much of the change in wages was due to shifts between occupations. Additionally, we use a kernel density estimation to perform a similar exercise across the entire distribution of wages.

To briefly summarize the results of our shift-share analysis, we find that wages for Blacks rose from \$14.37 to \$16.45. This increase in wages for Blacks was 46% more due to occupational mobility. In the case of Hispanics,wages rose from \$13.98 to \$14.65.The between effect was marginal (\$0.19) compared to the Blacks.

To estimate whether there is a Hispanic crowding out effect, we begin by defining two shares:

$$S1_{ijt} = N_{ijt}/N_{jt} \tag{1}$$

$$S2_{ijt} = N_{ijt}/N_{it} \tag{2}$$

$S1$ captures the fraction of workers who are Black (or any other race) amongst all workers in occupation j, year t. We will refer to this as a measure of *occupational concentration*. $S2$ captures the fraction of Black(or any other race) workers in occupation j, year t amongst Black (other race) workers in all occupations in year t. We will refer to this as a measure of *occupational importance*.

We then estimate the following models:

$$S2_{ijt} = \alpha + \beta\ S1_{i'jt} + \epsilon_{ijt} \tag{3}$$

$$S2_{ijt} = \alpha + \beta\ S2_{i'jt} + \epsilon_{ijt} \tag{4}$$

$$\Delta S2_{ijt} = \alpha + \beta \Delta S1_{i'jt} + \epsilon_{ijt} \tag{5}$$

$$\Delta S2_{ijt} = \alpha + \beta \Delta S2_{i'jt} + \epsilon_{ijt} \quad (6)$$

Where:

$$\begin{aligned}
i &= \text{Black, Hisp, White} \\
i' &= \text{Not i} \\
j &= \text{all occupations considered} \\
t &= \text{1980, 1990, 2000, 2005, 2006 and 2007} \\
N_{ijt} &= \text{Number of Black/Hisp/White workers in occupation j in year t} \\
N_{jt} &= \text{Total number of workers in occupation j in year t} \\
N_{it} &= \text{Total number of Black/Hisp/White workers in year t} \\
\Delta S2_{ijt} &= S2_{ijt} - S2_{ijt-1} \\
\Delta S1_{ijt} &= S1_{ijt} - S1_{ijt-1}
\end{aligned}$$

The first two equations (3 and 4) will be used to estimate the effect of Hispanic occupational concentration and Hispanic occupational importance, respectively, on Black occupational importance. These first two models are expressed in levels and will be estimated separately for all the years. Equations 5 and 6 regress changes in the LHS variable on changes in the RHS variable and are more arguably causal. In order to interpret the estimates from equation 5 as causal, the following assumption must hold: unobserved shocks to changes in importance of the occupation to Blacks are uncorrelated with changes in the occupational concentration of Hispanics. A higher concentration of Hispanics will typically mechanically create a smaller *concentration* of Blacks, however variation in the LHS variable due to overall growth or decline in the total number of jobs in the occupation will mitigate this mechanical correlation. A similar

identifying assumption must also hold for equation 6. We hope to better identify these coefficients in future work, however we believe that estimating descriptive correlations in this case is informative as it describes trends in shifts in the occupational labor supply of these two groups.

Below we will focus primarily on equations 5 and 6. The coefficient estimate from equation 5 will be interpreted as a measure of the magnitude of crowding out between Hispanics and Blacks: what is the effect of a 10% point increase in Hispanic occupational concentration on Black occupational importance? The coefficient estimate from equation 6 will be interpreted as a measure of how correlated changes in occupational importance are for the two groups: when the share of the Hispanic labor force working in an occupation increases by 1% point, by how much does this increase for Blacks?

5 Results

To summarize our results, we find three things: (1) occupational reallocation has been important for Black wages, (2) there seems to be significant crowding out effect of Hispanics on Black occupational choice, and (3) there is a clear strong and positive correlation in the occupational importance for the two groups, suggestive that labor demand shocks affecting both groups explain most of the occupational reallocation that has taken place over the last 27 years. Below, we present these results in more detail.

5.1 Reallocation and Wages

Table 10 shows the results of our shift share analysis for Blacks, Hispanics, Whites and All others. Actual wages for Blacks rose from $14.37 to $16.45. This is a $2.08 increase in wages between 1980 to the middle of this decade. In 2007 the counterfactual wage per hour was $15.79, thereby implying that even

if the share of Blacks remained constant in an occupation, wages would have risen by $1.42. This implies a between effect of 66 cents. Thus occupational mobility increased the wage growth by an additional 66 cents on what would have been only a $1.42 increase with a static occupational distribution. Thus the wage increases 46% higher than they would have been without the occupational mobility and 32% of the wage gain is attributable to the between effect. This is consistent with Blacks being able to re-specialize to avoid competition with Hispanics by shifting occupation. It is also consistent with re-specialization for any other number of reasons.

In the case of Hispanics, wages rose from $13.98 to $14.65. This is a $0.67 increase in wages between 1980 to the middle of this decade. In 2007 the counterfactual wage per hour was $14.46, thereby implying that even if the share of Hispanics remained constant, wages would have rise by $0.48. This is a between effect of 19 cents. Thus the wage increased 40% more than they would have been without the occupation mobility and 28% of the wage gain is attributable to the between effect. A further look at the kernel density figures (See Figures 1 and 2) allow us to see the actual and counterfactual wages for the entire wage distribution. They show us the between effect is more pronounced for the Blacks (than the Hispanics) and is prevalent across the entire distribution for Hispanics.

From these results it seems like occupational reallocation matters in terms of determining average wages. The regressions in the next section will tell us if occupational reallocation is because of cross ethnic labor market competition.

5.2 Evidence on Causes of Reallocation

In Table 11 we present our regression results. Column (3) show results of the regression of Black occupational importance on Hispanic occupational concen-

tration for each of the 6 years. When doing the regression in levels, the coefficients are negative for 1980, 1990 and 2000 but positive for the subsequent years. They are significant only for 1980 and 2007. Similarly, column (4) shows results of the regression of Black occupational importance on Hispanic Occupational importance. The coefficient is negative and significant for all but the year 1980. While these results are suggestive of crowding *out*, they do not account for occupational fixed effects and are thus likely highly endogenous. Once we include the occupational fixed effects, we find we find estimates of substantial (or significant) crowding out.Column (5) show our point estimate of -.052 implying that an occupation where Hispanics grew from 20% of the occupation in 1980 to 30% of workers in 2007 would have declined in occupational importance to Blacks by approximately 5% points (for example, the occupation would have declined from employing 5% of Black workers to employing no Black workers. We will assess the magnitude of these effects in a moment, but first we turn our attention to the regressions that correlate occupational importance for the two groups.

We now look for more evidence of crowding by running "importance on importance" regressions, column (6). A negative coefficient would suggest that as a larger share of the Hispanic workforce moves into a particular occupation, Blacks move out of this occupation. This would be consistent with *occupational Balkanization*. A positive coefficient is evidence that the primary reason for changes in the occupational distribution are driven by labor demand shocks that affect both groups. A coefficient of +1 would indicate that these two groups are affected homogenously by labor demand shocks. Our regressions yield coefficients between .778 (column 4) and .770 (column 6), providing strong evidence that the dominant theme in changes to the occupational distributions of Black and Hispanic labor are labor demand shocks that effect each group

similarly.

Turning our attention back to the economic significance of the crowding out effect, we present Table 12. As in Table 8, we present the 1980 level and 1980 to 2007 changes for the 10 fastest declining occupations for Blacks. Using our estimated coefficient of -.052 in the "crowding out" regression and the observed change in Hispanic concentration in each of these occupations, we estimate the implied decline for Blacks and the share of the decline that can be explained by the increased concentration of Hispanic workers. We find large effects. The median amount of decline explained by increased Hispanic concentration in these occupation is 42% of the total decline.

5.3 Heterogeneous Affects

We further illustrate the occupation changes for each race by gender, age and education level.In the case of men, Table 13, Occupations like Machine operators, Freight and Material Handlers and Fabricators and Assemblers, saw the largest drop Black men workers. These occupations also saw the largest drop in Hispanic men workers, thereby re-instating that these groups are similarly affected by common demand shocks Wages in the above three occupation dropped for both Black men and Hispanic men during the period1980 to 2007.

We also look at the smallest occupation change for each of the four races by age. We have divided the population into two groups, those between the age of 18 and 35 and those above the age of 35 years. Age might be a determining factor in deciding whether or not one should change their occupation. For example a person who is younger (18 to 35) might have more flexibility and hence might be able to change occupations faster and easily compared to someone who is older (above 35 years). Table 15 shows the results for Blacks aged 18 to 35.The biggest drop in occupation were for Secretaries and Stenographers (3.13%), Machine

operators (2.53 %) and Fabricators and Assemblers (2.51 %).

The final analysis done was for High School Dropouts (HSD). A person counts as HSD if he has less than 10 years of education. About 9% of all Black HSD worked as freight, stock and material handlers in 1980 at an hourly wage of $13.01. During the period 1980 to 2007,those occupations which saw a fall in the number of Blacks, saw a comparable increase in the number of Hispanics. For examples while the number of Black HSD working as housekeepers, maids and butlers dropped from 1980 to 2007, it increased in numbers for Hispanics.

6 Conclusion

Over the past few decades the U.S. labor market has been flooded with lower skilled immigrants. While foreign born workers who were High School Dropouts more than tripled between 1980 and 2007, native born HSD workers decreased in numbers. The labor market literature found little empirical evidence to the claim that immigrants depress wages of similarly skilled workers. In this paper, we access whether the impact of immigration is mitigated by occupational transition of natives. In particular, we focus on the labor market outcomes of African American workers because they are over represented among HSD and they are liked to be affected by low skilled immigration.

The results of the shift-share analysis show that the wage increase was 46% higher than what it would have been without occupational mobility. Similarly, 32% of the wage gain is attributable to the between effect indicating the Blacks are able to re-specialize to avoid competition with Hispanics by shifting their occupations. The point estimates from the regression results are negative, statistically significant and large in magnitude. A 10% point increase of Hispanics in an occupation would decline the occupational importance of Black by approximately 5% point. We also find strong evidence that the dominant theme

in changes to occupational distribution of Black and Hispanic are labor demand shocks that effect each group similarly.

The analysis in the above sections describes the correlations between the *equilibrium* occupational distributions for Black and Hispanic labor. Without a suitable instrument, this correlation measures both how Black labor supply is affected by changes in the labor supply of Hispanic, as well as how Black labor supply is affected by demand shocks common to the two groups. For future work we would like to use an Instrumental variable to isolate the causal effect of shifts in Hispanic labor supply on the occupational distribution of Black workers.A variable that affects Hispanic occupational labor supply but is uncorrelated with Black labor demand (or Hispanic labor demand, to be safe) will serve as a relevant and valid instrument

To summarize our results we find three things. One, occupation reallocation has been important for Black wages. Two, there seems to be substantial (or significant) crowing out effect of Hispanics on Black occupational choice. And three, there is a strong and positive correlation in the occupational importance for the two groups, suggesting that common labor demand shocks affect both have affected both groups and explain most of the occupational reallocation over the past three decades.

References

Alston, L. (1981), 'Tenure choice in southern agriculture', *Explorations in Economic History* **18**, 211–232.

Altonji, J. & Card, D. (1989), 'The effects of immigration on the labor market outcomes of less-skilled natives', *Princeton Industrial Relations Section Working Paper* **256**.

Altonji, J. G. & Card, D. (1991), 'Immigration, trade, and the labor market', *John. M. Abowd and Richard B. Freeman edts.* pp. 201–234.

Amuedo-Dorantes, C., Bansak, C. & Raphael, S. (2007), The impact of amnesty on labor market outcomes: A panel study using the legalized population survey.

Angelucci, M. (2005), 'U.s. border enforcement and the net inflow of illegal migration', *IZA Discussion Paper* **1642**.

Angrist, J. D. & Kugler, A. D. (2003), 'Protective or counter-productive? labour market institutions and the effect of immigration on eu natives', *The Economic Journal* **113**(488), F302–F331.

Autor, D. & Dorn, D. (2008), 'Inequality and specialization: The growth of low-skilled jobs in the united states', *Mimeo* .

Borjas, G. (2003), 'The labor curve is downward sloping: Reexamining the impact of immigration on the labor market', *Quarterly Journal of Economics* pp. 1335–1374.

Borjas, G. (2005), 'Native internal migration and the labor market impact of immigration', *NBER Working Paper* **11610**.

Borjas, G. (2006), 'Native internal migration and the labor market impact of immigration', *Journal of Human Resources* **41**(2), 221–258.

Borjas, G. J. (1987), 'Immigrants, minorities, and labor market competition', *Industrial and Labor Relations Review* **40**(3), 382–392.

Boustan, L. P. & Margo, R. A. (2007), 'Going postal: What black employment in the postal service reveals about the increasing cost of racial segregation, 1940-2000', *Working Paper* .

Butcher, K. & Card, D. (1991), 'Immigration and wages: Evidence from the 1980's', *The American Economic Review* **81**(2), 292–296.

Card, D. (1990), 'The impact of the mariel boatlift on the miami labor market', *Industrial and Labor Relations Review* **43**(2), 245–257.

Card, D. (2001), 'Immigrant inflows, native outflows, and the local market impacts of higher immigration', *Journal of Labor Economics* **19**(1), 22–64.

Card, D. (2005), 'Is the new immigration really so bad?*', *The Economic Journal* **115**(507), F300–F323.

Card, D. (2007), 'How immigration affects u.s. cities', *CReAM Discussion Paper* **11/07**.

Card, D. & Lewis, E. G. (2005), 'The diffusion of mexican immigrants during the 1990s: Explanations and impacts', *NBER Working Paper* **W11552**.

Card, David & DiNardo, John (2000), 'Do immigrant inflows lead to native outflows?', *The American Economic Review* **90**(2), 360–367.

Card, David & Krueger, Alan B. (1994), 'Minimum wages and employment: A case study of the fast-food industry in new jersey and pennsylvania', *The American Economic Review* **84**(4), 772–793.

Card, David & Krueger, Alan B. (2000), 'Minimum wages and employment: A case study of the fast-food industry in new jersey and pennsylvania: Reply', *The American Economic Review* **90**(5), 1397–1420.

Friedberg, R. M. (2001), 'The impact of mass migration on the israeli labor market', *The Quarterly Journal of Economics* **116**(4), 1373–1408.

Friedberg, Rachel M. & Hunt, Jennifer (1995), 'The impact of immigrants on host country wages, employment and growth', *The Journal of Economic Perspectives* **9**(2), 23–44.

Greene, W. H. (2003), *Econometric Analysis, 3rd edition*, Prentice-Hall, New Jersey.

Hanson, G. H. & Spilimbergo, A. (1999), 'Illegal immigration, border enforcement, and relative wages: Evidence from apprehensions at the u.s.-mexico border', *The American Economic Review* **89**, 1337–1357.

Kugler, A. & Yuksel, M. (2008), 'Effects of low-skilled immigration on u.s. natives: Evidence from hurricane mitch', *IZA Discussion Paper* .

Peri, G. & Ottaviano, G. I. (2005), 'Rethinking the gains from immigration: Theory and evidence from the u.s.', *UCD Working Paper* .

Peri, G. & Ottaviano, G. I. (2007), 'The effects of immigration on u.s. wages and rents: A general equilibrium approach', *CReAM Discussion Paper* .

Peri, G. & Sparber, C. (2007), 'Task specialization, comparative advantages, and the effects of immigration on wages', *NBER Working Paper* **13389**.

Peri, G. & Sparber, C. (2009), 'Task specialization, immigration and wages"', *American Economic Journal, Applied Economics* .

Tables

Table 1: Total Share of Immigrant Population by Skill Category

	High School Dropout	High School Graduate	Secondary College	College Graduate
1980	0.12	0.05	0.06	0.08
1990	0.22	0.07	0.08	0.10
2000	0.34	0.10	0.10	0.14
2005	0.42	0.14	0.11	0.16
2006	0.42	0.15	0.11	0.17
2007	0.44	0.15	0.11	0.17

Source: Public Use Microdata Sample and Current Population Survey

Table 2: Mean wages for natives in the working age by education (2007 dollars)

	High School Drouput	High School Graduate	Secondary College	College Graduate
1980	14.51	15.64	15.94	23.33
1990	13.52	15.30	16.86	25.51
2000	13.77	16.07	18.07	28.28
2005	13.50	16.03	18.66	30.47
2006	13.02	15.45	17.73	28.77
2007	13.32	15.74	17.97	29.28
Pct change 1980 2007	-8.19	0.65	12.73	25.55

Source: Public Use Microdata Sample and Current Population Survey

Table 3: Prior Elasticity Estimates

Author	**Labor Market**	**Variation**	**Elasticity**	**Outcome**
Altonji & Card	U.S.	Lagged Shares	-1.2	wage
Card (1990)	Miami	Boarlift	≈ 0	wage & Empl
Kugler & Yuksel (2008)	U.S.	Hurricane	$+.062$ to $+.125$	wage
Hunt (1992)	France	Pied Noir Repatriation	$-.82$	wage
Angrist & Kugler (2003)	E.U.	Balkan Wars	$-.02$ to $-.07$	Empl
Friedberg (2001)	Israel	Peristroka	$+.718$	wage
Borjas (2005)	U.S. Ph.D.s	Cohort	$-.31$	wage
Borjas (2003)	U.S. low-skilled	Cohort	$-.947$	wage

Table 4: Summary Statistics

Variable	**Mean**	**(Std. Dev.)**	**Min.**	**Max.**	**N**
Census year	1993.822	(9.398)	1980	2007	19134375
Person weight	36.365	(48.164)	0	1997	19134375
Age	37.963	(12.33)	18	64	19134375
Occupation, 1990 basis	384.38	(248.799)	22	875	19134375
Hourly Wage	17.148	(9.311)	4.205	55.619	19134375
Highest Grade Completed	13.191	(2.818)	0	22	19134375
Male Indicator Variable	0.522	(0.5)	0	1	19134375
Immigrant Indicator Variable	0.111	(0.314)	0	1	19134375
African-American Indicator Variable	0.095	(0.293)	0	1	19134375
Latino Indicator Variable	0.09	(0.286)	0	1	19134375
White Indicator Variable	0.771	(0.42)	0	1	19134375

Table 5: Most Common Occupations

Occupations, 1990 basis (3 digit code)	**Freq.**	**Percent**	**Cum.**
Executives and Managers (22)	53,762,64	7.73	7.73
Accountants and auditors (23)	9,215,66	1.32	9.05
Insurance underwriters (24)	444,232	0.06	9.11
Other financial specialists (25)	4,181,057	0.60	9.72
Management analysts (26)	1,797,037	0.26	9.97
Personnel, HR, training(27)	4,137,514	0.59	10.57
Purchasing agents and buyers (28)	64,201	0.01	10.58
Buyers, wholesale and retail trader (29)	1,156,913	0.17	10.74
Purchasing managers, agents and buyers (33)	2,266,657	0.33	11.07
Business and promotion agents (34)	165,090	0.02	11.09

Table 6: Largest Black Occupations in 1980

	Rank	Blacks	Black%	Hispanics	Hispanic%	Wage Black	Wage Hisp
Freight, Stock and Material Hand	1	502,960	5.87	296,020	5.89	13.46	13.03
Nursing aides, orderlies, and at	2	363,940	4.25	81,740	1.63	11.45	10.99
Janitors	3	358,560	4.19	153,460	3.05	12.00	12.13
Truck, delivery, and tractor dri	4	326,940	3.82	162,280	3.23	15.47	15.58
Secretaries, Stenographers and T	5	323,920	3.78	191,300	3.81	12.80	12.27
Fabricators, Assemblers and Hand	6	323,300	3.78	235,140	4.68	15.49	13.62
Machine operators, n e c	7	316,860	3.70	212,900	4.23	14.86	13.38
Housekeepers, maids, butlers, st	8	310,640	3.63	99,440	1.98	10.26	9.93
Executives, Managers and adminis	9	288,700	3.37	198,100	3.94	18.16	17.71
Cooks, variously defined	10	219,680	2.57	94,040	1.87	10.76	10.93
All			38.96		34.31		

Table 7: Largest Black Occupations in 2007

	Rank	Blacks	Black%	Hispanics	Hispanic%	Wage Black	Wage Hisp
Nursing aides, orderlies, and at	1	907,713	6.13	462,864	2.47	12.62	11.61
Executives, Managers and adminis	2	784,662	5.30	854,648	4.57	23.56	22.36
Truck, delivery, and tractor dri	3	554,912	3.74	674,248	3.60	15.67	14.96
Freight, Stock and Material Hand	4	535,148	3.61	723,108	3.86	12.84	11.47
Retail sales clerks	5	497,582	3.36	579,015	3.09	14.45	14.47
Cashiers	6	497,259	3.36	463,148	2.48	10.69	10.45
Cooks, variously defined	7	439,608	2.97	713,821	3.82	10.98	10.38
Janitors	8	383,605	2.59	603,357	3.22	12.49	11.52
Secretaries, Stenographers and T	9	378,977	2.56	395,635	2.11	16.41	15.53
Customer service reps, investiga	10	372,623	2.51	329,781	1.76	14.43	14.04
All			36.13		30.98		

Table 8: Smallest Black Employment Change from 1980-2007

	Rank	AA 1980	AA Change	H 1980	H Change
Machine operators	1	3.70	-2.37	4.23	-2.68
Freight and Material Handlers	2	5.87	-2.26	5.89	-2.02
Housekeepers, maids and butlers	3	3.63	-2.22	1.98	0.06
Fabricators and Assemblers	4	3.78	-2.12	4.68	-2.52
Janitors	5	4.19	-1.60	3.05	0.17
Secretaries and Stenographers	6	3.78	-1.23	3.81	-1.69
General office clerks	7	2.30	-1.22	1.86	-0.89
Textile sewing machine operators	8	1.37	-1.18	2.55	-2.10
Farm workers	9	0.87	-0.71	3.42	-1.08
Production supervisors	10	1.32	-0.68	1.96	-1.25

Table 9: Wage Changes for Smallest Black Employment Change from 1980-2007

	Rank	AA 1980	2007	Change	H 1980	2007	Change
Machine operators	1	14.86	14.69	-0.17	13.38	12.70	-0.68
Freight and Material Handlers	2	13.46	12.84	-0.63	13.03	11.47	-1.57
Housekeepers, maids and butlers	3	10.26	10.98	0.72	9.93	10.32	0.39
Fabricators and Assemblers	4	15.49	15.01	-0.48	13.62	12.72	-0.89
Janitors	5	12.00	12.49	0.49	12.13	11.52	-0.61
Secretaries and Stenographers	6	12.80	16.41	3.61	12.27	15.53	3.26
General office clerks	7	12.79	14.94	2.15	12.09	13.70	1.61
Textile sewing machine operators	8	10.00	12.34	2.34	9.85	9.19	-0.66
Farm workers	9	10.44	10.78	0.35	10.68	9.58	-1.10
Production supervisors	10	18.75	19.07	0.33	17.53	17.57	0.04

Table 10: Black Average wage weighted by actual and counterfactual occupation distribution

	Mean Wage (Weighted by actual occ distribution)	Mean Wage (Weighted by 1980 occ distribution)
BLACK		
1980	14.37	14.37
1990	15.24	14.99
2000	16.45	15.90
2005-2007	16.45	15.79
HISPANIC		
1980	13.98	13.98
1990	14.21	14.13
2000	14.71	14.51
2005-2007	14.65	14.46
WHITE		
1980	16.10	16.10
1990	17.04	16.80
2000	18.58	17.95
2005-2007	19.22	18.47
ALL		
1980	15.80	15.80
1990	16.61	16.42
2000	17.88	17.40
2005-2007	18.27	17.75

Table 11: OLS and Fixed Effect Regression Analysis

	(3)	(4)	(5)	(6)
	Occ Imp. of Blacks	Occ Imp. of Blacks	Change in Occ Imp. of Blacks	Change in Occ Imp. of Blacks
Occ Conc. of Hispanics in year ==1980	-0.0450			
	(11.25)**			
year==1990	-0.0002	-0.00100		
	(0.53)	(3.08)**		
year==2000	-0.00100	-0.00200		
	(1.22)	(6.10)**		
year==2005	0.00100	-0.00100		
	(1.67)	(5.04)**		
year==2006	0.00100	-0.00100		
	(1.94)	(4.90)**		
year==2007	0.00100	-0.00100		
	(2.12)*	(4.96)**		
Occ Imp. of Hispanics		0.778		
		(40.13)**		
Change in Occ Conc. of Hispanics			-0.0520	
			(2.76)**	
Change in Occ Imp. of Hispanics				0.770
				(6.57)**
Constant			0.00200	-0.00100
			(0.73)	(0.87)
Observations	1670	1670	277	277
Number of Occupation, 1990 basis	281	281		
significant at 5%; ** significant at 1%				
R-squared			0.110	0.540
Robust t statistics in parentheses				
Absolute value of z statistics in parentheses				

Table 12: Smallest Black Employment Change from 1980-2007

	Rank	AA 1980	AA Change	Change in concentration of Hispanics	Percentage of Crowding Out
Machine operators	1	3.70	-2.37	-0.6233	0.26
Freight and Stock Handler	2	5.87	-2.26	-0.7572	0.33
Housekeepers, maids and butlers	3	3.63	-2.22	-1.3861	0.63
Fabricators and Assemblers	4	3.78	-2.12	-0.5635	0.27
Janitors	5	4.19	-1.60	-0.9751	0.61
Secretaries and Stenographers	6	3.78	-1.23	-0.2949	0.24
General office clerks	7	2.30	-1.22	-0.4787	0.39
Textile sewing machine operators	8	1.37	-1.18	-1.2271	1.04
Farm workers	9	0.87	-0.71	-1.7410	2.46
Production supervisors	10	1.32	-0.68	-0.4250	0.62

Table 13: Smallest Black Men Employment Change from 1980-2007

	Rank	AAM 1980	AAM Change	LM 1980	LM Change
Machine operators	1	4.75	-2.93	4.69	-2.90
Freight and Material Handler	2	8.82	-2.69	7.17	-2.55
Fabricators and Assemblers	3	4.36	-2.15	4.59	-2.08
Janitors	4	5.85	-1.99	3.97	-0.50
Farm workers	5	1.32	-1.02	4.45	-1.47
Production supervisors	6	2.07	-1.02	2.60	-1.67
Metal and Plastic Workers	7	1.26	-0.95	1.41	-1.12
Precision Metal Workers	8	1.13	-0.74	1.52	-1.13
Construction laborers	9	2.82	-0.70	2.60	3.43
Housekeepers, maids and butlers	10	1.04	-0.52	0.68	-0.29

Table 14: Wage Changes for Smallest Black Men Employment Change from 1980-2007

	Rank	AAM 1980	2007	Change	HM 1980	2007	Change
Machine operators	1	16.26	15.56	-0.71	14.85	13.36	-1.50
Freight and Material Handlers	2	13.99	13.11	-0.88	13.89	12.10	-1.80
Fabricators and Assemblers	3	17.21	15.73	-1.48	15.57	13.62	-1.95
Janitors	4	12.49	13.02	0.53	12.59	12.27	-0.32
Farm workers	5	10.40	10.59	0.18	10.82	9.76	-1.05
Production supervisors	6	19.93	19.55	-0.38	19.06	18.72	-0.33
Metal and Plastic Workers	7	17.85	15.52	-2.33	15.75	13.49	-2.26
Precision Metal Workers	8	18.07	16.88	-1.19	17.80	16.37	-1.43
Construction laborers	9	14.20	15.03	0.82	15.10	13.13	-1.96
Housekeepers, maids and butlers	10	11.96	12.64	0.68	11.96	10.95	-1.01

Table 15: Smallest Black aged 18-35 Employment Change from 1980-2007

	Rank	AA 1980	AA Change	H 1980	H Change
Secretaries and Stenographers	1	5.16	-3.13	4.69	-2.72
Machine operators	2	3.68	-2.53	4.03	-2.68
Fabricators and Assemblers	3	4.13	-2.51	4.77	-2.78
Freight and Material Handler	4	6.30	-1.71	6.29	-2.25
General office clerks	5	2.82	-1.66	2.11	-1.01
Janitors	6	3.24	-1.49	2.41	-0.17
Textile sewing machine operators	7	1.51	-1.42	1.99	-1.67
Housekeepers, maids and butlers	8	1.81	-0.86	1.35	0.12
Production Inspectors, Testers,	9	1.21	-0.71	1.21	-0.63
Metal and Plastic Operator	10	0.83	-0.70	0.96	-0.84

Figure 1: Actual and Counterfactual Black wages

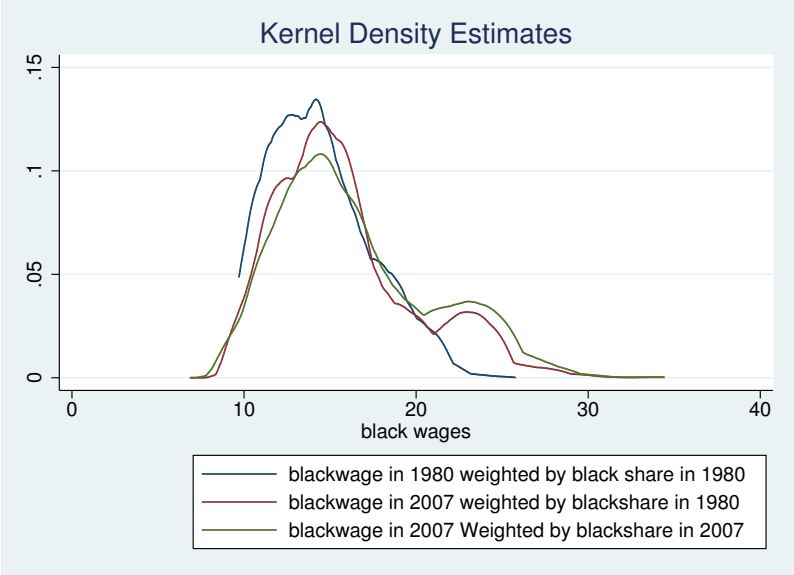

Figure 2: Actual and Counterfactual hisp wages