Earnings Inequality Within Detailed Occupations and Foreign-born Labor

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Introduction

Inequality of labor market earnings has increased over recent decades, with the US economy experiencing a period of polarizing wage growth due to changing technology and the importance of highly educated workers (Autor, 2009; Jones, 2009; Steelman and Weinberg, 2005). This growth has not been uniform across occupations. Those requiring high skill and more education, such as managerial and professional occupations, have benefited with rapid growth, as have service-oriented occupations needing the least education. Autor (2009) suggests these low-paying jobs are difficult to automate, cannot be outsourced, and require in-person performance.

At the same time that inequality has been rising, the composition of the American workforce has shifted to a higher proportion of foreign-born workers, from 5.2 percent in 1970 to 15.6 percent in 2007 (Newburger and Gryn, 2009). Some researchers consider foreign-born workers an important component of the economy as they offer a large supply of labor for jobs that are plentiful and difficult to fill (Enchautegui, 1998; Orrenius, 2003; Ottaviano and Peri, 2006; Hanson, 2007). Others argue that the abundance of foreign-born workers depresses natives' wages and may provide a less expensive substitute for native workers (Borjas, 2003; Orrenius and Zavodny, 2006; Hanson, 2007).

This research attempts to examine how the growth of foreign-born labor may have contributed to rising earnings inequality. An influx of foreign-born labor with different human capital endowments may have macro level effects on inequality. In this research, we use the changing prevalence of occupations as an indicator of the changing industrial and technological bases of the US economy. Our examination of educational attainment and earnings within occupations serves as an indicator of changing human capital endowments in the US labor force and the changing returns on human capital.

Data

- American Community Survey (ACS) 3-year file for 2006-2008 and Census 2000 long form.
- Both household surveys collected similar social, demographic, and economic measures including nativity, employment status, occupation, educational attainment, earnings in the last 12 months, and numerous other characteristics for all members of the household. Because of their large sample sizes, both data sources allow for analysis of detailed occupations.
- The universe for this analysis was people 16 years and older at the time of the survey who reported working at some point in the previous 12 months. Limited datasets to include only non-imputed responses for nativity and occupation, in addition to year-of-entry in the ACS data. Scope limited to those detailed occupations which met the threshold of at least 500 unweighted sample cases in the ACS data, resulting in 448 detailed occupations. For educational attainment of subgroups, we calculated percentages only for those with at least 100 unweighted cases.

Data issues

- The 3-year ACS refers to the collection period 2006 through 2008, not a single reference day or year.
- Using the ACS 3-year file complicated interpretation of analysis referring to time spans.
  - In the ACS, questions on work status and earnings refer to the 12 month period preceding the interview date, thus making the reference period for these data 2005 through 2008. All earnings were CPI-adjusted to reflect the most recent year (2008).
  - Census 2000 reference period for these two concepts was calendar year 1999.
  - Thus, analysis of occupation growth, change in earnings, and number of recent immigrants may be understated or overstated.
- As the ACS is not a longitudinal survey and does not measure flow of workers well, foreign-born workers who had left the US before the survey date are not accounted for in our estimates of foreign-born workers.
- As foreign-born workers increase their length of residence, shifts in occupation and education levels convolute their initial characteristics at entry when measured at a later date. It is possible some of the recently-arrived foreign-born workers described in these data had already begun to assimilate. However, these biases would tend to reduce rather than inflate the effects described in this paper.

Methods

- We examined the change in prevalence of each occupation within the US economy between 2000 and 2006-2008 by calculating the difference in distributions of workers across occupations at these two time points. We then compared this difference to the distribution across occupations of immigrant workers who had entered the country since January 1, 2000 – the recent arrivals.
- We next explored changing earnings and the proportions of foreign-born workers within detailed occupations. We considered the percent change in earnings between 1999 and 2005-2008 and compared this to the number of recent immigrants in each occupation. We also considered the differences in educational attainment between recently-arrived foreign-born workers and other workers (natives and foreign born who arrived before 2000) in these occupations.
- Finally, using the Gini coefficient, we investigated earnings inequality within detailed occupations in relation to the number of recently-arrived foreign-born workers.

Are occupations that are growing in importance the same as those which attract new foreign-born labor?

- Yes, Figure 1 illustrates the proportional shift in occupational importance between 2000 and 2006-2008 with occupations that are growing in importance on the left, and those shrinking on the right. Recent immigrants tended to concentrate within those occupations that were either growing or shrinking in prevalence.
- Figure 2, Figure 3, and Table 1 highlight characteristics of selected occupations at the two ends of the changing prevalence spectrum. Although both growing and shrinking occupations attract large numbers of recently-arrived immigrants, these recent arrivals make up a high proportion of foreign-born labor in growing occupations. In contrast in shrinking occupations, foreign born who entered the country before 2000 predominate among foreign-born labor.

Figure 1. Distribution of Recently-Arrived Foreign-Born Workers in 2006-2008 and Change in Occupation Prevalence Since 2000

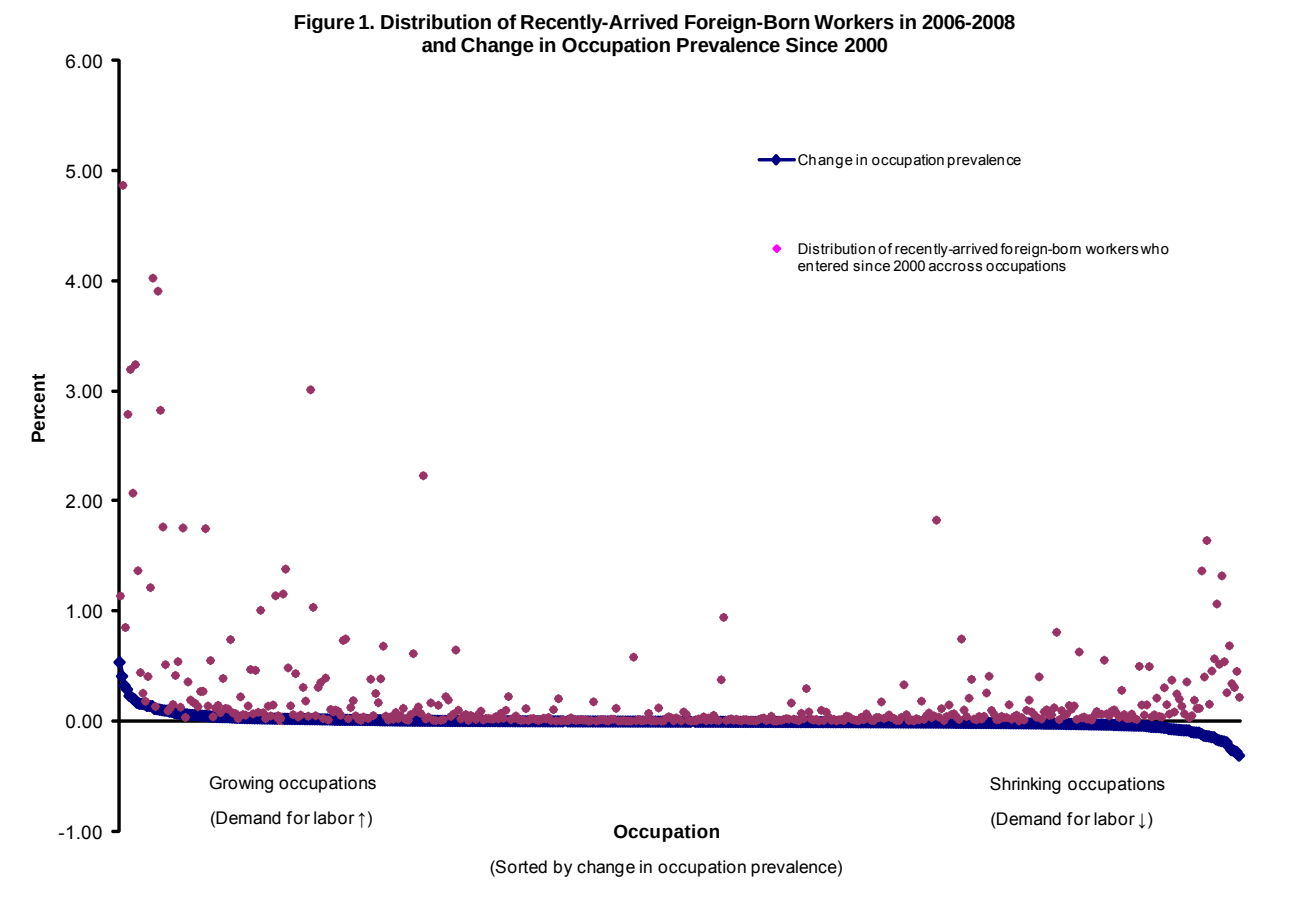


Figure 2. Foreign-Born Labor by Occupation in Selected Growing Occupations, 2006-2008

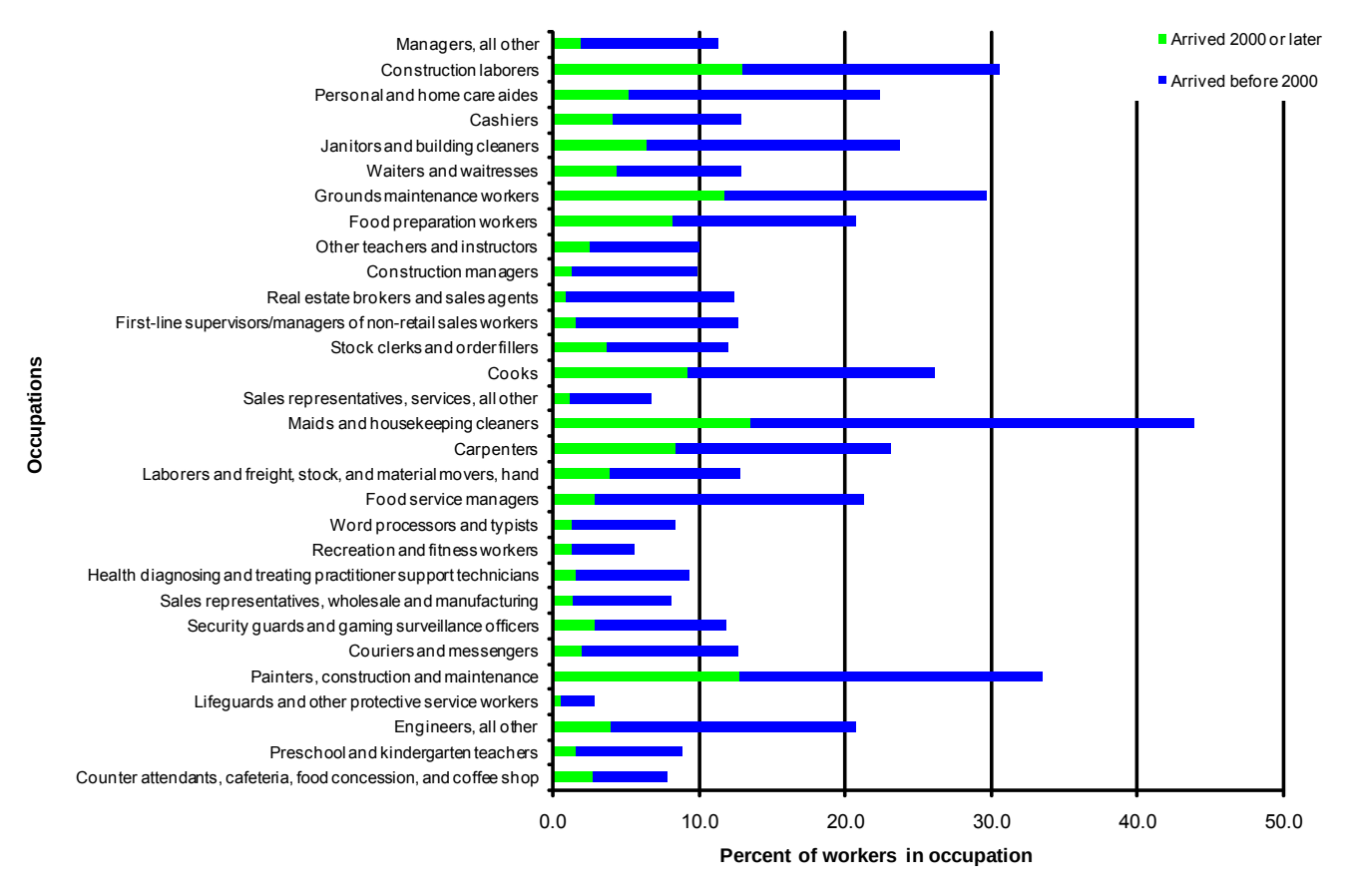


Figure 3. Foreign-Born Labor by Occupation in Selected Shrinking Occupations, 2006-2008

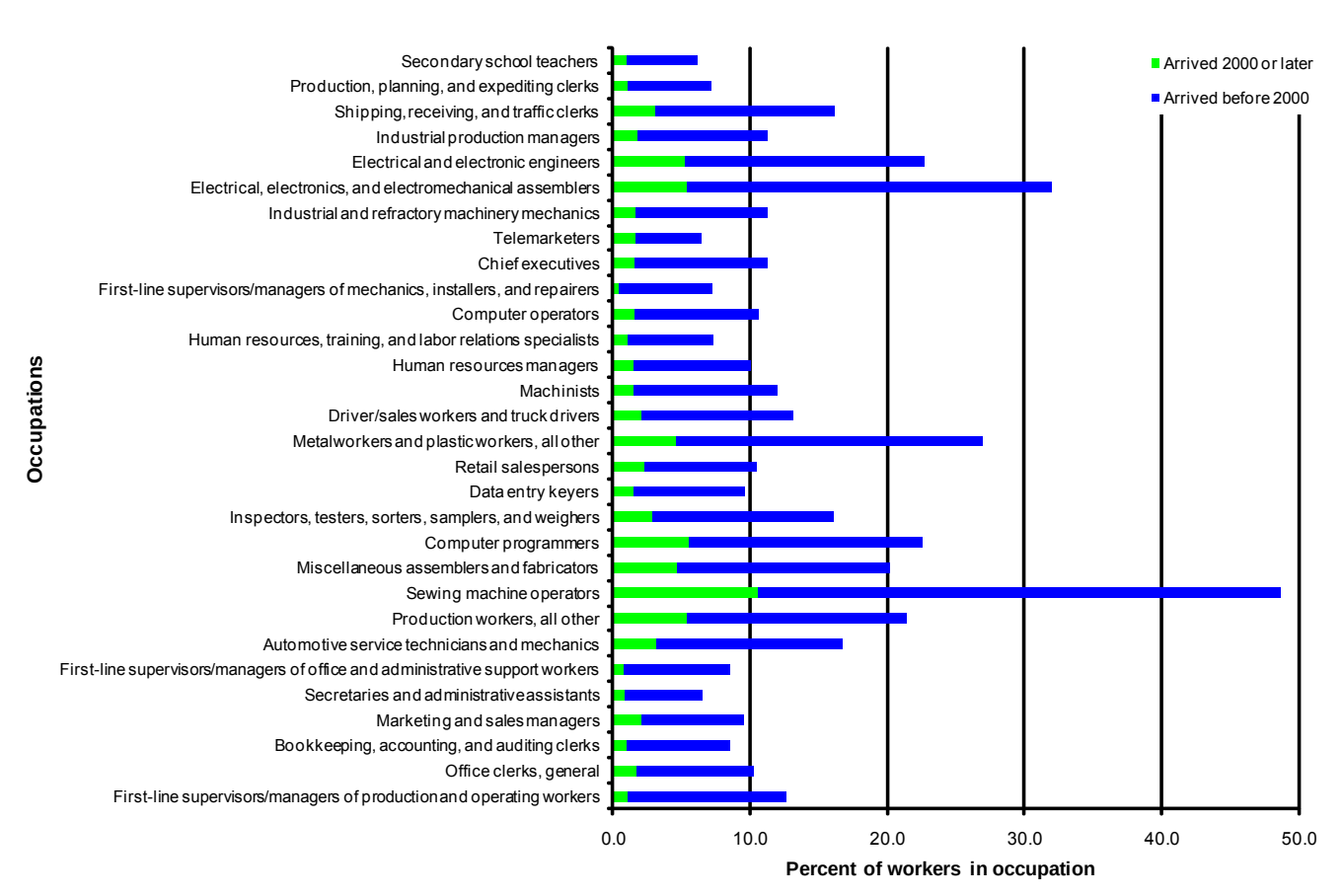


Table 1. Foreign-Born Labor in Selected Growing and Shrinking Occupations, 2006-2008

Occupation	Change in occupation prevalence since 2000	Margin of error	Distribution of foreign born arrived since January 2000	Margin of error	Percent foreign born	Margin of error	Proportion of foreign born arrived since January 2000	Margin of error
Growing occupations								
Managers, all other	0.5	0.02	1.1	0.04	11.3	0.17	16.9	0.62
Construction laborers	0.4	0.01	4.9	0.14	30.6	0.40	42.6	0.99
Personal and home care aides	0.3	0.01	0.9	0.06	22.5	0.52	23.5	1.24
Cashiers	0.3	0.02	2.8	0.08	12.9	0.19	31.8	0.80
Janitors and building cleaners	0.2	0.02	3.2	0.09	23.8	0.27	27.2	0.66
Waiters and waitresses	0.2	0.02	2.1	0.09	12.9	0.27	34.5	1.12
Grounds maintenance workers	0.2	0.01	3.2	0.11	29.7	0.44	39.6	0.97
Food preparation workers	0.2	0.01	1.4	0.06	20.7	0.53	39.7	1.32
Other teachers and instructors	0.2	0.01	0.4	0.03	10.0	0.31	25.5	1.51
Construction managers	0.2	0.01	0.3	0.02	9.9	0.30	13.6	1.16
Real estate brokers and sales agents	0.2	0.01	0.2	0.02	12.4	0.33	7.5	0.73
First-line supervisors/managers of non-retail sales workers	0.1	0.01	0.4	0.03	12.7	0.30	12.8	0.92
Stock clerks and order fillers	0.1	0.01	1.2	0.05	12.0	0.27	30.5	1.20
Cooks	0.1	0.02	4.0	0.14	26.2	0.42	35.6	0.75
Sales representatives, services, all other	0.1	0.01	0.1	0.02	6.8	0.31	17.1	1.90
Maids and housekeeping cleaners	0.1	0.01	3.9	0.11	43.9	0.42	30.8	0.69
Carpenters	0.1	0.01	2.8	0.11	23.2	0.44	36.4	1.05
Laborers and freight, stock, and material movers, hand	0.1	0.02	1.8	0.07	12.9	0.24	30.4	0.96
Food service managers	0.1	0.01	0.5	0.04	21.3	0.47	13.5	0.86
Word processors and typists	0.1	0.01	0.1	0.01	8.3	0.34	15.6	1.77
Recreation and fitness workers	0.1	0.01	0.1	0.02	5.6	0.32	23.7	3.01
Health diagnosing and treating practitioner support technicians	0.1	0.01	0.2	0.02	9.4	0.39	17.3	2.05
Sales representatives, wholesale and manufacturing	0.1	0.01	0.4	0.03	8.2	0.21	17.3	1.18
Security guards and gaming surveillance officers	0.1	0.01	0.5	0.04	11.9	0.39	24.4	1.40
Couriers and messengers	0.1	0.01	0.1	0.02	12.7	0.62	16.1	1.98
Painters, construction and maintenance	0.1	0.01	1.8	0.08	33.5	0.64	38.3	1.29
Lifeguards and other protective service workers	0.1	0.00	0.0	0.01	2.8	0.31	22.0	4.53
Engineers, all other	0.1	0.01	0.4	0.02	20.7	0.54	19.3	1.07
Preschool and kindergarten teachers	0.1	0.01	0.2	0.02	8.9	0.32	18.3	1.80
Counter attendants, cafeteria, food concession, and coffee shop	0.1	0.01	0.2	0.02	7.8	0.49	35.0	3.06
Shrinking occupations								
Secondary school teachers	-0.1	0.01	0.1	0.01	6.1	0.23	15.6	1.52
Production, planning, and expediting clerks	-0.1	0.01	0.1	0.01	7.3	0.45	15.7	2.24
Shipping, receiving, and traffic clerks	-0.1	0.01	0.4	0.03	16.1	0.47	19.0	1.57
Industrial production managers	-0.1	0.01	0.1	0.01	11.3	0.61	16.1	2.02
Electrical and electronic engineers	-0.1	0.01	0.2	0.02	22.7	0.72	23.3	1.80
Electrical, electronics, and electromechanical assemblers	-0.1	0.01	0.2	0.02	31.9	1.10	16.8	1.70
Industrial and refractory machinery mechanics	-0.1	0.01	0.1	0.02	11.2	0.53	14.9	2.05
Telemarketers	-0.1	0.01	0.1	0.02	6.5	0.65	25.8	5.22
Chief executives	-0.1	0.01	0.4	0.03	11.2	0.31	14.0	0.96
First-line supervisors/managers of mechanics, installers, and repairers	-0.1	0.01	0.0	0.01	7.2	0.49	6.3	1.63
Computer operators	-0.1	0.00	0.0	0.01	10.6	0.70	14.8	3.03
Human resources, training, and labor relations specialists	-0.1	0.01	0.2	0.02	7.3	0.27	14.8	1.67
Human resources managers	-0.1	0.01	0.1	0.01	10.0	0.45	15.4	1.64
Machinists	-0.1	0.01	0.1	0.02	12.0	0.58	12.5	1.93
Driver/sales workers and truck drivers	-0.1	0.02	1.4	0.06	13.1	0.19	15.6	0.66
Metalworkers and plastic workers, all other	-0.1	0.01	0.4	0.03	26.9	0.71	16.9	1.14
Retail salespersons	-0.1	0.02	1.6	0.06	10.5	0.17	21.6	0.75
Data entry keyers	-0.1	0.01	0.2	0.02	9.6	0.40	15.8	1.82
Inspectors, testers, sorters, samplers, and weighers	-0.1	0.01	0.5	0.04	16.1	0.43	17.9	1.25
Computer programmers	-0.1	0.01	0.6	0.03	22.6	0.57	24.6	1.23
Miscellaneous assemblers and fabricators	-0.2	0.01	1.1	0.05	20.2	0.43	23.4	1.04
Sewing machine operators	-0.2	0.01	0.5	0.04	48.6	1.07	21.7	1.41
Production workers, all other	-0.2	0.01	1.3	0.07	21.4	0.46	25.0	1.07
Automotive service technicians and mechanics	-0.2	0.01	0.5	0.04	16.6	0.43	18.8	1.08
First-line supervisors/managers of office and administrative support workers	-0.2	0.01	0.3	0.02	8.5	0.18	9.4	0.77
Secretaries and administrative assistants	-0.2	0.02	0.7	0.04	6.6	0.12	13.2	0.66
Marketing and sales managers	-0.3	0.01	0.3	0.02	9.5	0.31	22.3	1.40
Bookkeeping, accounting, and auditing clerks	-0.3	0.01	0.3	0.03	8.5	0.21	11.7	0.91
Office clerks, general	-0.3	0.01	0.5	0.03	10.3	0.30	17.3	1.09
First-line supervisors/managers of production and operating workers	-0.3	0.01	0.2	0.02	12.6	0.37	8.9	0.84

Table 2. Selected Gateway Occupations for Recently-Arrived Foreign-Born Workers, 2006-2008

Occupation	Recently-arrived foreign born as percent of occupation	Margin of error	Percent of recently-arrived foreign born with high school or more	Margin of error	Percent of recently-arrived foreign born with bachelor's or more	Margin of error	Difference in percent high school or more (recently-arrived foreign born minus others)	Difference in percent bachelor's degree or more (recently-arrived foreign born minus others)	Percent change in median earnings since 2000
Construction laborers	13.0	0.4	37.4	1.2	3.4	0.4	-31.5	-1.4	11.1
Cooks	9.3	0.3	49.7	1.2	6.1	0.7	-15.5	3.0	17.2
Maids and housekeeping cleaners	13.5	0.4	56.3	1.3	9.0	0.8	-3.3	5.7	21.5
Grounds maintenance workers	11.8	0.4	31.8	1.4	2.8	0.5	-32.7	-3.3	12.4
Janitors and building cleaners	6.5	0.2	54.9	1.5	9.1	0.7	-15.7	4.9	14.1
Miscellaneous agricultural workers	18.0	1.0	22.4	1.4	1.7	0.4	-26.9	-2.9	25.0
Carpenters	8.4	0.3	49.1	1.8	5.1	0.6	-28.2	-1.5	14.4
Cashiers	4.1	0.1	77.1	1.4	16.7	1.0	5.6	12.3	7.3
Postsecondary teachers	8.5	0.3	100.0	0.0	96.0	0.6	0.1	4.2	22.9
Waiters and waitresses	4.5	0.2	72.0	1.6	16.1	1.3	-8.4	7.6	17.7
Computer software engineers	11.9	0.4	99.9	0.1	97.6	0.4	0.2	18.2	38.9
Laborers and freight, stock, and material movers, hand	3.9	0.2	52.7	1.7	6.9	1.0	-21.8	3.2	6.4
Painters, construction and maintenance	12.8	0.5	46.3	2.4	6.2	1.0	-23.6	-0.7	11.8
Nursing, psychiatric, and home health aides	4.3	0.2	86.6	1.4	21.8	1.4	1.7	15.4	24.4
Retail salespersons	2.3	0.1	84.5	1.4	25.0	1.6	-4.4	7.4	20.4
Child care workers	4.5	0.2	74.4	1.9	21.3	1.7	-6.2	10.9	8.6
Food preparation workers	8.2	0.4	51.2	2.3	7.9	1.2	-14.8	3.6	5.8
Driver/sales workers and truck drivers	2.0	0.1	73.6	2.1	15.1	1.6	-6.9	10.5	21.6
Production workers, all other	5.4	0.3	54.0	2.0	8.5	1.2	-23.7	4.0	21.5
Stock clerks and order fillers	3.7	0.2	68.9	2.5	15.2	1.7	-11.5	9.6	11.2
Packers and packagers, hand	12.3	0.6	44.2	2.3	5.2	0.9	-18.9	2.2	14.4
Registered nurses	2.2	0.1	99.8	0.2	80.5	1.6	-0.1	24.8	40.2
Managers, all other	1.9	0.1	97.2	0.7	78.3	1.7	0.0	25.8	33.3
Miscellaneous assemblers and fabricators	4.7	0.2	58.7	2.1	9.7	1.3	-21.0	5.3	22.7
Accountants and auditors	2.6	0.1	99.9	0.1	87.7	1.3	0.1	12.8	36.8
Dishwashers	15.3	0.8	35.4	2.5	4.0	1.1	-13.5	2.7	16.4

Definitions and Concepts

- Foreign-born workers
  - Workers who indicated they were not born in the United States, not born in Puerto Rico, Guam, the U.S. Virgin Islands, or Northern Marianas, and were not born abroad of American parent or parents.
- Recently-arrived foreign born workers
  - Foreign-born workers who said they came to live in the United States in 2000 or after.
- Gateway occupations
  - Occupations with a large number of recently-arrived foreign-born workers.
- Gini index
  - Measures the dispersion of earnings. It ranges from zero (perfect equality) to one (perfect inequality).

Are those occupations with increasing earnings those in which the recently-arrived foreign-born proportion increased?

- No, Figure 4 shows the number of recent arrivals sorted by the percent change in median earnings between 1999 and 2005-2008 for each occupation. In general, we see smaller numbers of recent arrivals where the percent change in earnings within occupations was largest. Occupations with comparatively smaller or even negative change in earnings attracted much larger numbers of recently-arrived foreign born.
- Figure 5 shows the difference for each occupation of the proportion of recently-arrived foreign born with a high school diploma from the proportion of all others (native and foreign born who arrived before 2000) in the occupation with a high school diploma. No large difference in high school attainment is apparent for many occupations with larger gains in median earnings. Occupations with smaller changes in median earnings tended to have larger differences in educational attainment, indicating that for these occupations the proportion of recent arrivals with a high school education is substantially less than that for natives or earlier immigrants.
- Figure 6 repeats Figure 5, but for bachelor's degree or higher. Here, for many occupations, the proportion of recent arrivals with a bachelor's degree or more is higher than that for natives and earlier immigrants.

Figure 4. Recently-Arrived Foreign-Born Workers and Percent Change in Median Earnings

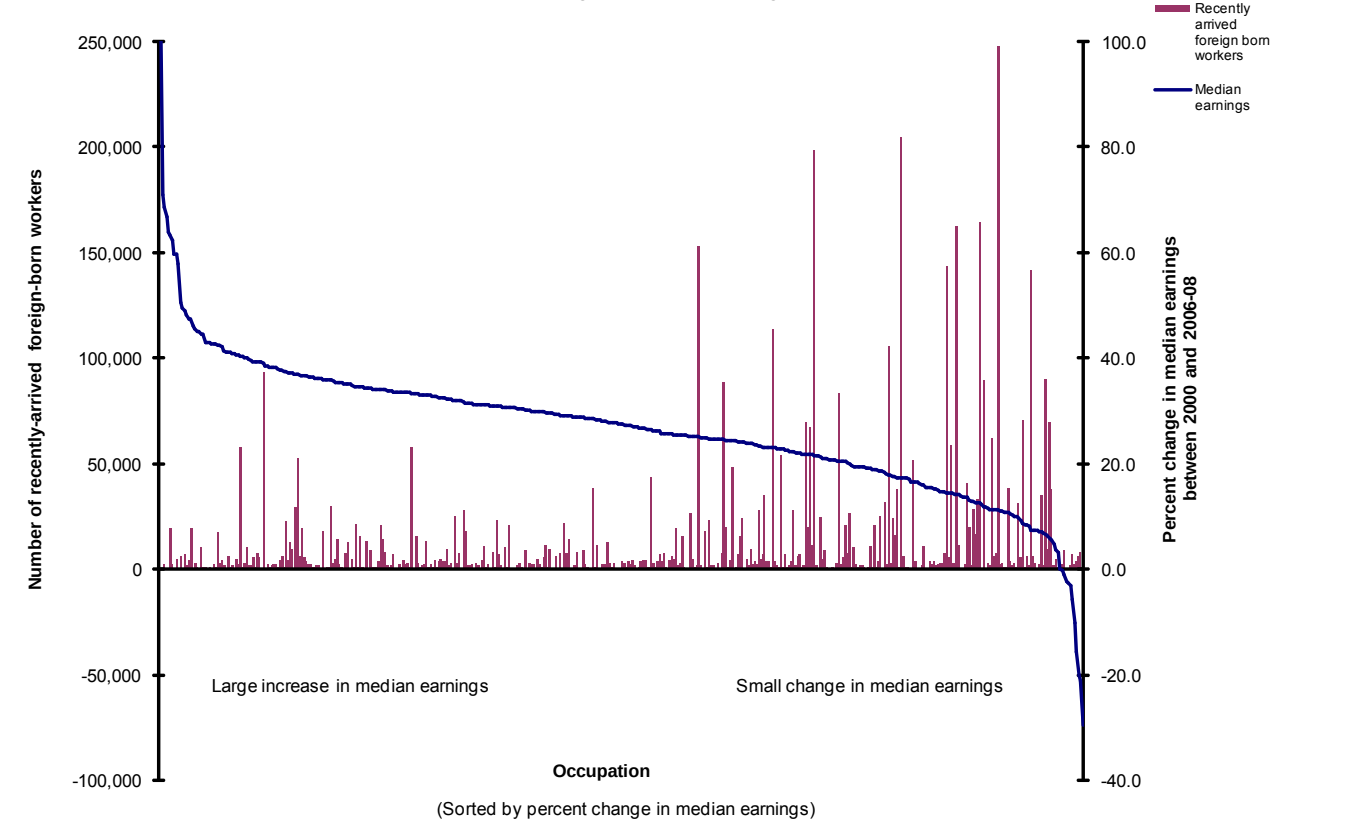


Figure 5. Effect of Recently-Arrived Foreign-Born Workers on Educational Attainment of Occupation: High School or More, 2006-2008

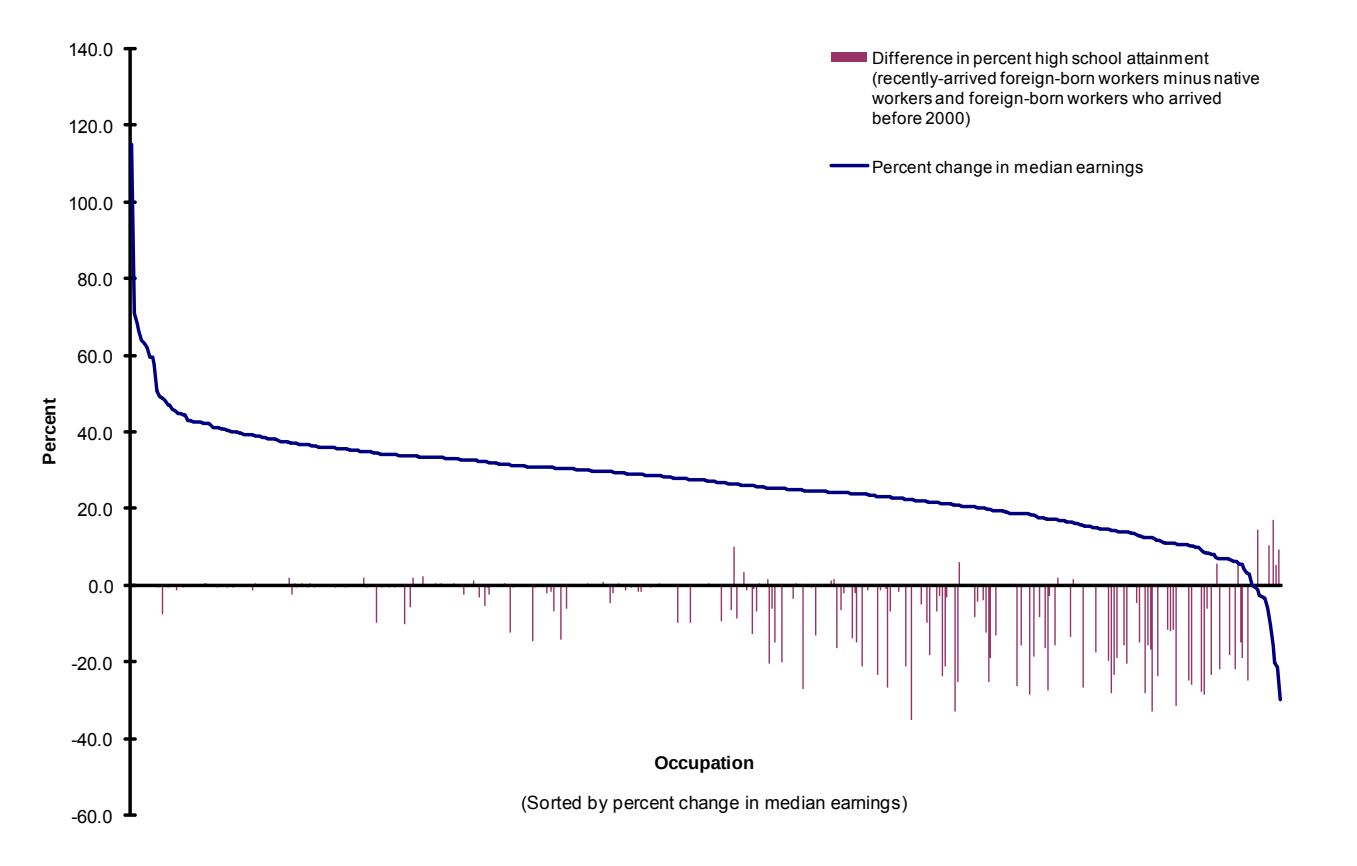
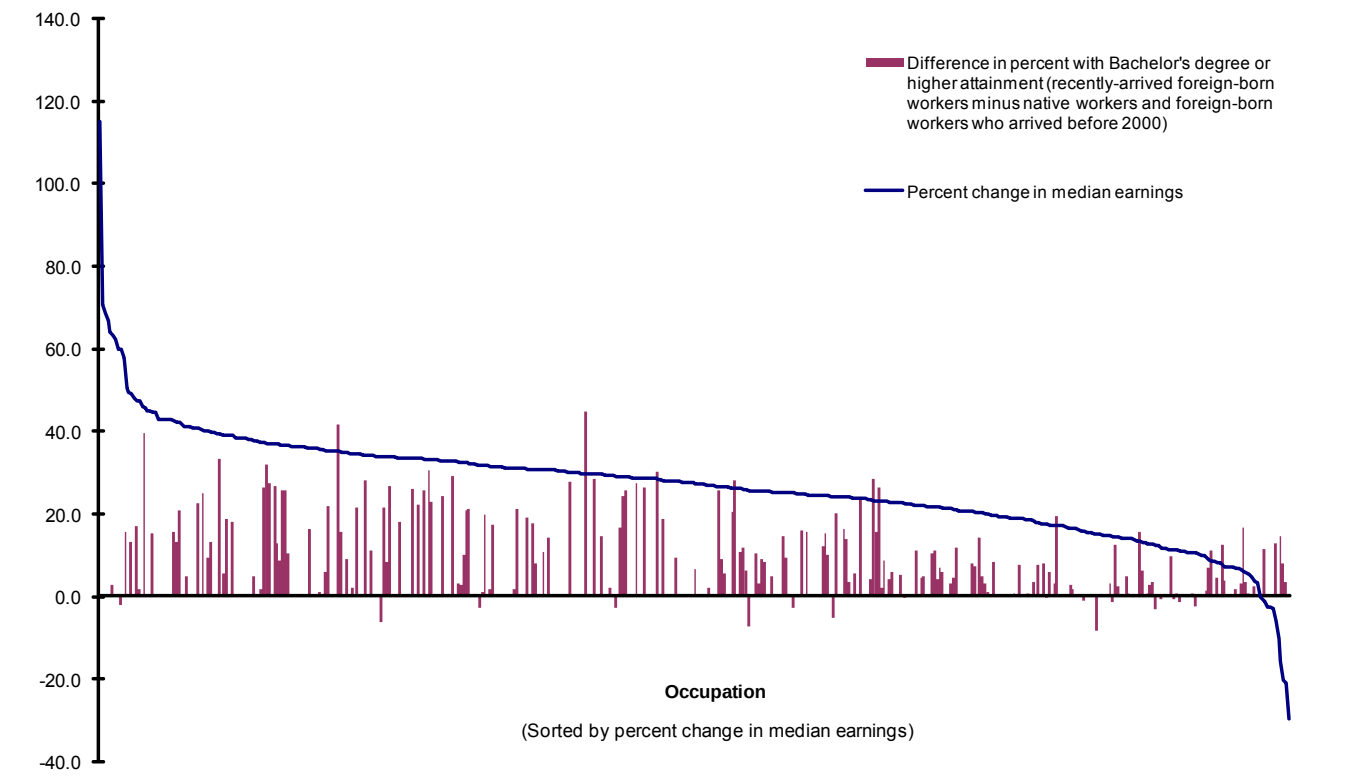


Figure 6. Effect of Recently-Arrived Foreign-Born Workers on Educational Attainment of Occupation: Bachelor's Degree or More, 2006-2008



Since 2000, has earnings inequality within each occupation increased more for occupations with an increased share of recently-arrived foreign born?

- Figure 7 displays occupations with the largest numbers of recently-arrived foreign-born workers, the gateway occupations. About one-half (53 percent) of newly-arrived immigrants worked in these occupations.
- Table 2 displays the percentage recently-arrived workers in each occupation as well as the shift in educational attainment and percent change in median earnings for each occupation. Most occupations shown here experienced a decrease in high school attainment and some an increase in college attainment.
- Figure 8 shows the percent change between 1999 and 2005-2008 in earnings inequality as measured by the Gini index for all workers by occupation, and sorted by the increase in the number of the recently-arrived foreign born in each occupation. Positive and negative changes in the index occur with no easily discernable pattern for most occupations. However, it appears that within gateway occupations inequality has generally increased since 1999. Figure 9 is an enlargement of Figure 8 for selected gateway occupations.

Figure 7. Gateway Occupations for Recently-Arrived Foreign-Born Workers, 2006-2008

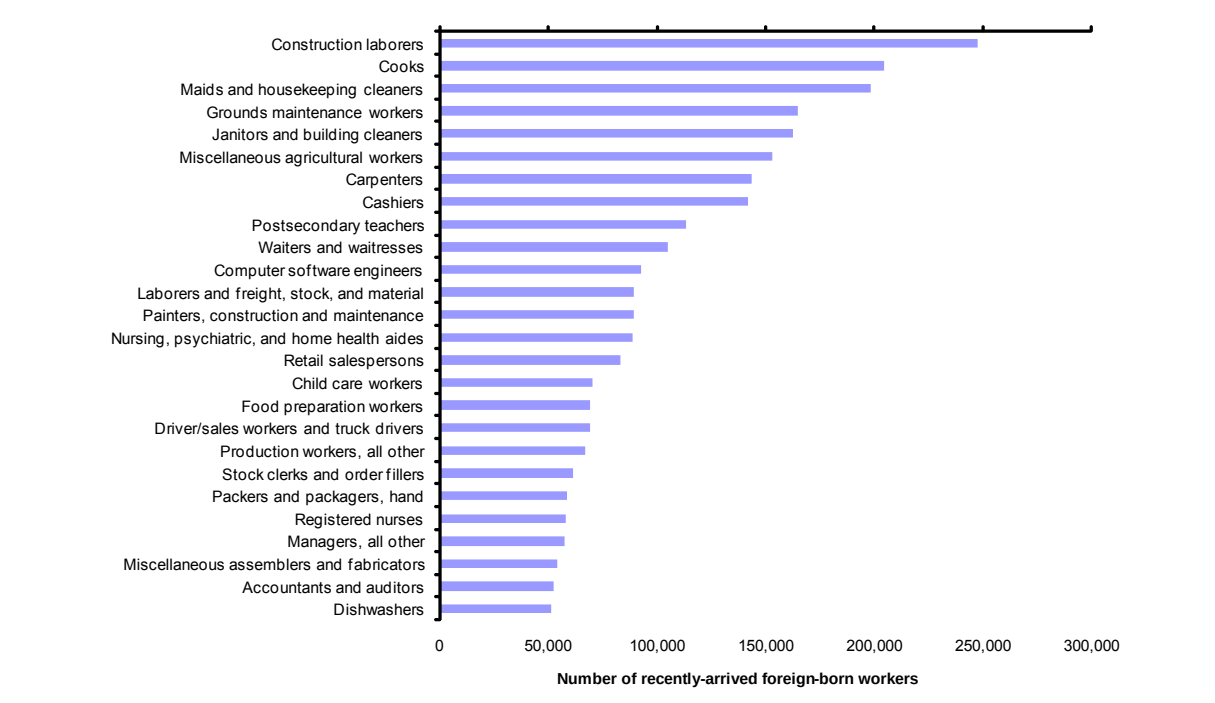


Figure 8. Percent Change in Gini Index Between 2000 and 2006-2008 for All Workers by Occupation

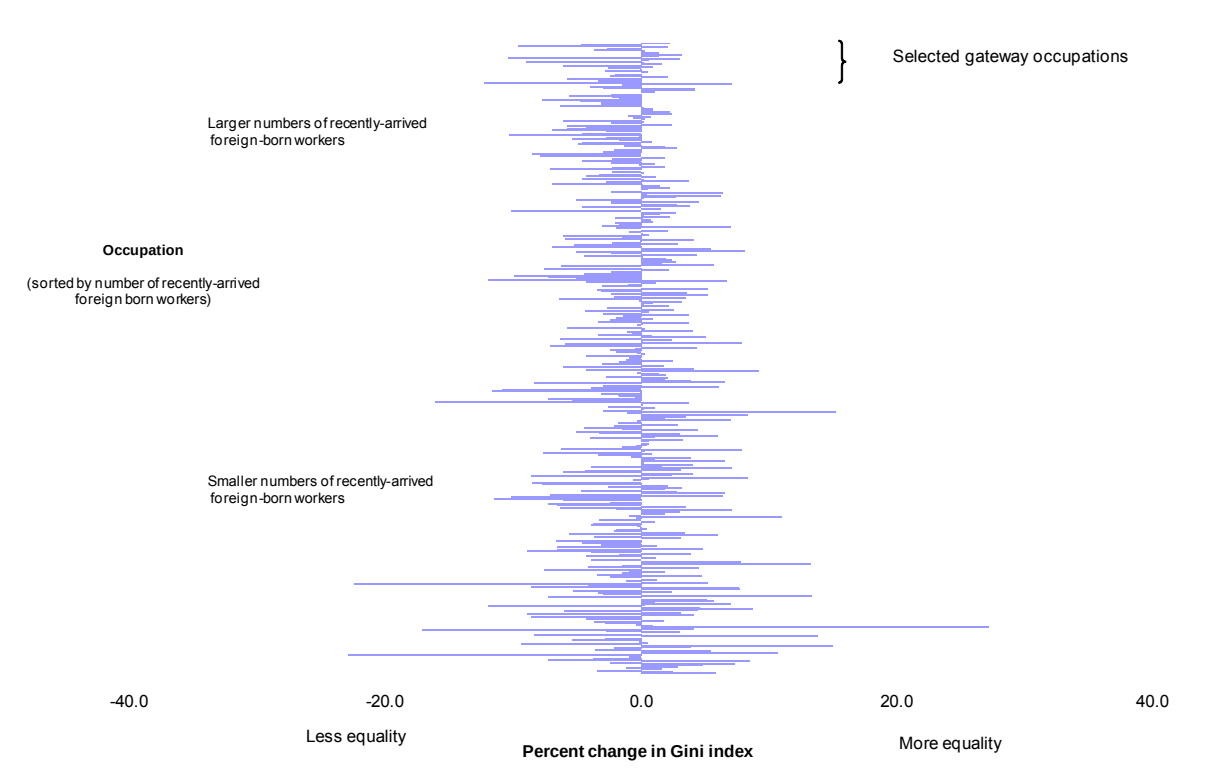
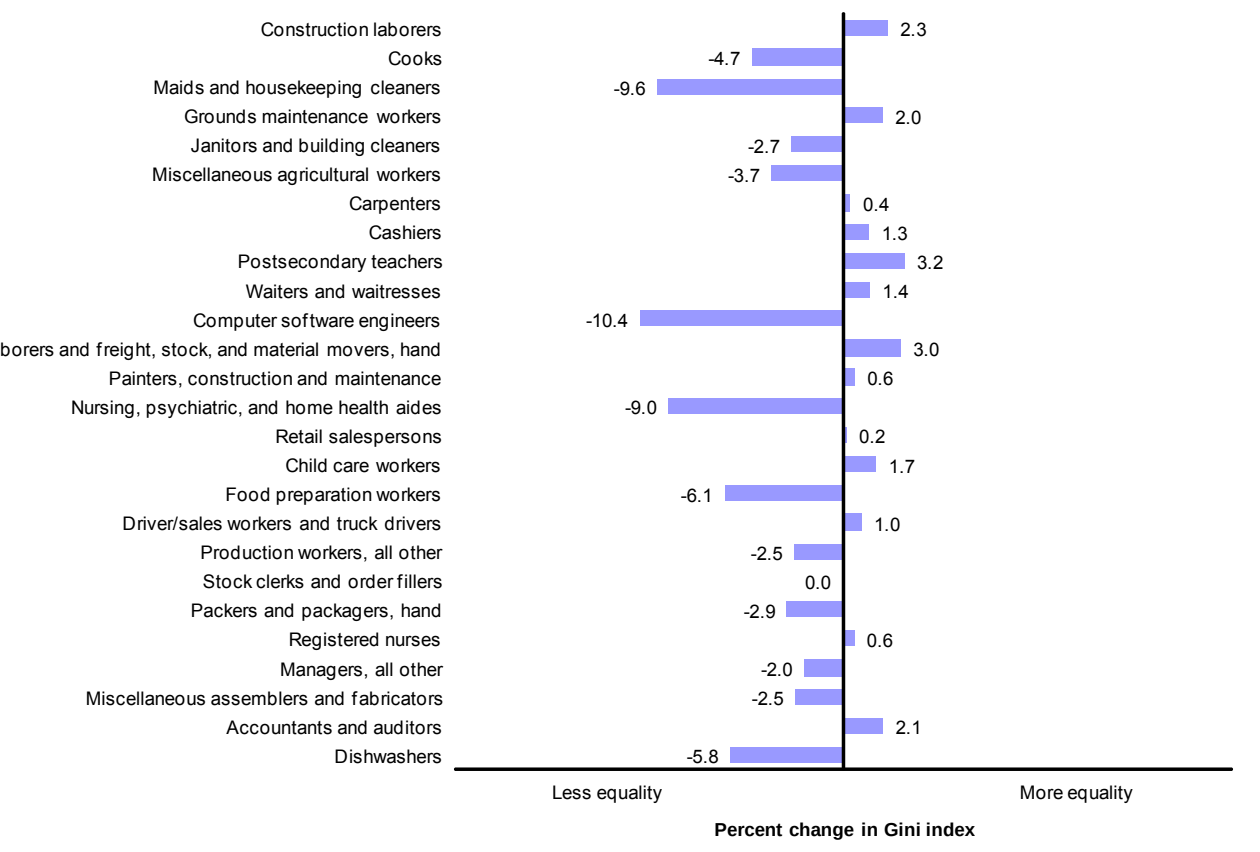


Figure 9. Percent Change in Gini index for All Workers Between 2000 and 2006-2008 in Selected Gateway Occupations



Discussion

- Occupations that are changing in importance—either growing or shrinking in prevalence—attract greater numbers of recently-arrived foreign-born workers than occupations which did not experience a large change in prevalence. This suggests that foreign-born labor may be vital to the processes which change the nation's industrial and economic base. As growing occupations have a high demand for labor, foreign-born workers provide one source. Either foreign-born workers take advantage of new jobs in the economy, or firms that can employ workers with the human capital that foreign-born workers can offer are able to grow because they have access to a supply of labor.
- An examination of the length of residence of foreign-born workers by occupation at the two ends of the change spectrum provides additional evidence of the importance of foreign-born labor to growth sectors of the economy. Among foreign-born workers, growing occupations employ higher proportions of those who have recently arrived. Shrinking occupations employ higher proportions of foreign born who have been in this country for some time. It is possible that today's shrinking occupations were yesterday's gateway occupations, and that the recently-arrived foreign born have entered these shrinking occupations through social networks and migration pathways.
- Recently-arrived foreign born tended to concentrate in occupations with smaller gains in earnings since 1999. In occupations that had experienced smaller earnings increases, the net effect of recent migration was to reduce average educational attainment. In those occupations that had experienced greater earnings increases, the net result of recent migration was to increase educational attainment.
- Thus, flows of foreign born into the US tended to increase differences in human capital between the top and bottom of the labor market in terms of earnings. Increasing earnings inequality may be the end result, as compensation may reflect returns on human capital investments.

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To get Census 2000 and ACS data, access American FactFinder at: http://factfinder.census.gov/home/saff/main.html?_lang=en

The estimates in this poster (which may be shown in text, figures, and tables) are based on responses from a sample of the population and may differ from actual values because of sampling variability or other factors. As a result, apparent differences between the estimates for two or more groups may not be statistically significant. All comparative statements have undergone statistical testing and are significant at the 90-percent confidence level unless otherwise noted.

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