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ABSTRACT

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Abstract

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1. Introduction

Occupational segregation by sex, the tendency of men and women to work in different occupations, has been widely found to be a source of gender differences in wages[1]. At the same time, the movement of women into higher paying, traditionally-male occupations contributed to the narrowing of the gender pay gap in the 1980s and 1990s (e.g., Blau and Kahn 2006). This implies that a slowing or stalling of the trend toward reduced occupational segregation could retard convergence in the gender pay gap[2] and might also adversely affect increases in female labor force participation, of which the female wage rate is an important determinant.[3]

While it is important to identify the trends in occupational segregation, there are considerable challenges to doing so accurately.[4] U.S. Census data probably provide the best source of occupational data for estimates of segregation, giving access to large sample sizes and a detailed occupational breakdown into a large number of categories--around 500 using the 1990 or 2000 codes. (With a small number of categories, predominantly female and predominantly male occupations may be combined into apparently integrated categories.) However, periodically the Census occupational classifications are revised to take into account changes in the labor force, thus breaking the comparability of the series. Since the estimate of

[1] For a recent review and new results, see Levanon, England, and Allison (2009); see also the review in Blau, Ferber, and Winkler (2010), Chapter 7.

[2] Blau and Kahn (2006) found, based on controls for 19 occupations, that slowing occupational convergence of men and women explained some of the slowing convergence in the gender pay gap in the 1990s.

[3] Married women's labor supply responsiveness to their own and their spouses' wages declined between 1980 and 2000, but remained substantial (Blau and Kahn 2007).

[4] For useful discussions of data issues, see England (1981), King (1992), Cotter et al. (1995), and Blau, Ferber and Winkler (2010), Ch.5.

segregation depends on which specific occupations are distinguished by the coding scheme (because of the possibility that some classification schemes may capture more or less segregation than others), a consistent set of occupational categories is needed to accurately measure the trends. Most recently, in 2000, the Census substantially revised its codes; a prior major revision occurred in 1980. (The Current Population Survey (CPS) adopted the revised Census codes with a short lag.) Another problem is that the long form of the Census, which contained the occupational data, was ended after the 2000 Census.

In this study, we overcome a number of data issues to provide the first estimates of the trends in occupational segregation by sex over a nearly forty year period (1970-2009) using a consistent set of occupational codes and data sources. We use data from the U.S. Census and the American Community Survey (ACS) and 2000 occupational codes (presenting some results for 1990 codes for comparative purposes). The ACS, which is fielded by the Census Bureau, is considered to be a replacement for the discontinued long form of the Census, and has been conducted annually since 2005 for a large sample of about 300,000 individuals (U.S. Census Bureau 2009). A major contribution of our study is to develop and apply a new crosswalk to bridge the changes in the Census occupational coding scheme that occurred in 2000. As we show below, although the Census Bureau has provided a crosswalk that may be used to convert earlier occupational data into the 2000 categories (Scopp 2003), its usefulness for the study of trends in sex segregation by occupation is limited because it is based on aggregate employment (i.e., men and women combined). Our alternative crosswalk is gender specific; it is based on a dual-coded CPS dataset we constructed from files provided by the Bureau of Labor Statistics, which contains both the 1990 and 2000 occupation codes at the individual level. There were

relatively few changes in the Census occupational coding scheme between the 1980 and 1990 Censuses, allowing for suitable comparisons over this period, with just a few simple adjustments. While there was a significant change in the Census occupation coding scheme between 1970 and 1980, the Census did provide a gender-specific crosswalk in that case, allowing us to incorporate the 1970 data into the analysis as well.

We apply our new crosswalk to examine the trends in occupational segregation by sex over the period. This allows us to update previous research on the trends into the 2000s and also to see whether findings for earlier periods are confirmed using the new occupational coding scheme, which may capture more or less gender segregation than the 1990 codes. While previous research has cast some light on the broad outlines of the trends, suggesting that occupational segregation by sex has been declining at a diminishing pace, it does not cover this full period (none examines the 2000s trends), sometimes requires comparisons between estimates based on different data sources (e.g., the Census and the CPS), and does not utilize the new 2000 codes. Research designed to more fully understand the determinants and consequences of occupational segregation, as well of its trends, will benefit from a long, accurate time series for occupational distributions, and a method by which current and future estimates of occupational segregation and occupational distributions of men and women may be linked back to earlier years. For example, England, Allison, and Wu (2007) argue that more years of data are important for estimating the relationship between occupational segregation and wages so that occupation fixed effects may be employed in the analysis.[5] More broadly,

[5] England, Allison, and Wu (2007) provide estimates for fixed effect models based on the 1983-2001 CPS; and Levanon, England, and Allison (2009) do so for 1950-2000 U.S. Census data using a smaller number of occupations (165) to obtain comparability.

we would argue that a gender-specific crosswalk should be used in any application where there is a need to bridge the discontinuity created by the change in the occupation codes in 2000 to produce occupational data for men and women separately.

2. Previous Research

Previous research using Census data indicates that occupational segregation by sex was substantial and relatively stable throughout the first half of the twentieth century (Gross 1968; Jacobs 1989). Beginning in 1960, however, segregation began to fall slightly (Blau and Hendricks 1979). This trend accelerated markedly over the 1970s (Bianchi and Rytina 1986).[6] The decline in occupational segregation continued over the 1980s, but at a slightly slower pace (Cotter et al. 1995; and Blau, Simpson and Anderson 1998).[7] Evidence on trends over the 1990s based on CPS data (Jacobs 2003), when compared with estimated changes based on Census data for earlier years (Blau, Simpson, and Anderson 1998), suggests that the pace of decline slowed further over that decade.[8] More recent work has used Census data to analyze the entire period from 1950 to 2000, confirming the aforementioned trends (Levanon, England, and Allison 2009). However, in order to obtain a consistent set of occupations for the whole period, the analysis uses just 165 occupations, which potentially limits the amount of segregation that can be detected.

[6] Beller (1985) reports a similar finding based on Census data for 1960 and 1970 and CPS data for 1971 and 1981.

[7] See also Jacobsen (1997) for the 1980s. For an excellent summary of studies and findings by decade for the 1950s through the 1980s, see Cotter et al. (1995), Table 1.

[8] This comparison is reported in Blau, Ferber, and Winkler (2010), Ch. 5. They note that the 1990 values of the index differ across the studies, suggesting that the levels of the index are not the same across these two data sources. However, they argue that the *changes* in the index may be compared. Beller (1985) made a similar assumption when comparing the 1960s and 1970s deceases in segregation using the Census and CPS.

3. Data

3.1 The U.S. Census Bureau crosswalk

The need for a crosswalk to bridge changes in occupation codes—between 1990 and 2000, for example—arises because all the incumbents of a particular 1990 occupational category do not necessarily fall within the same 2000 occupational category, but rather may be split across a number of 2000 categories. This problem may be illustrated using data on aggregate (male plus female) employment from the Census crosswalk (Scopp 2003). For the 1990 occupation of "managers, medicine and health," the Census crosswalk indicates that, although 94% of incumbents were classified as "medical and health services managers" using the 2000 occupation codes, 2% were classified as "education administrators" and 4% as "secretaries and administrative assistants." For each 1990 occupation, the Census crosswalk lists each of the 2000 occupations where incumbents from the original 1990 occupation were reclassified and provides conversion factors that may be applied to the 1990 (and previous years') data to convert them to the 2000 coding system.[9]

However, there is a significant problem in using the Census crosswalk for studying trends in occupational segregation by sex because it is based on aggregate employment (men and women combined). A significant amount of segregation is lost when the crosswalk is applied because the distribution of incumbents of the 1990 occupations across the new 2000 codes is implicitly assumed to be the same for both sexes. The underlying data employed by the Census Bureau in creating its aggregate crosswalk are no longer available, and, moreover,

[9] Conversion factors give the percentage of employment within each 1990 occupational category that was re-coded into each of the 2000 occupations.

did not include a gender breakdown.[10] For this reason, we have developed a gender-specific crosswalk using a CPS dataset with 2000 occupation codes provided by the Bureau of Labor Statistics (BLS) that may be combined with the standard monthly CPS data (containing 1990 occupation codes) to produce dual-coded data, with both the 1990 and 2000 occupation codes at the individual level. The dual-coded data may be constructed for each month of CPS data from 2000 to 2002, and include all the standard CPS variables, including the sex of the respondent.[11]

The bias introduced by using an aggregate crosswalk may be illustrated using the dual-coded CPS data. Consider the 1990 occupation "maids and housemen." For all workers (men and women combined), 87.0% of incumbents would be reclassified as "maids and housekeeping cleaners" in the 2000 codes and 8.2% as "janitors and building cleaners" (with the remaining 5% distributed across 61 other occupations). However, when the data are broken down by sex (which is not possible using the Census crosswalk), they indicate that only 59.1% of men as compared to 92.6% of the women should be reclassified as "maids and housekeeping cleaners" in the 2000 codes, while 31.1% of men but only 3.6% of women should be reclassified as "janitors and building cleaners." When such classification errors are aggregated across a large number of occupational categories, the resulting estimate of segregation may be biased downwards substantially.

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[10] Personal communication from Barbara Downs, Chief, Industry and Occupation Statistics Branch, Housing and Household Economic Statistics Division, U.S. Census Bureau (email, September 19, 2008).

[11] These data sets are available at http://www.bls.census.gov/cps_ftp.html . The data file titled "2000 Based Public Use Extract" contains the 2000 occupation (and industry) codes for each respondent in the CPS for each month over the 2000-2002 period. These data may be merged (using the combination of month, household ID, and person ID) with the standard CPS data sets (titled "Basic Monthly CPS") which contain the 1990 occupation codes.

3.2 Data sources

We use two primary data sources to conduct our analysis of the trends in occupational segregation: the U.S. Census and the ACS. In addition, as noted above, CPS data are used to construct our gender-specific crosswalk. We also present some analyses using the CPS as a robustness check on our Census results based on a different data source that is available annually. Further, since the CPS adopted the 2000 Census codes with a lag, it is possible to observe the trends in occupational segregation based on the 1990 codes for the entire 1990 to 2000 period without relying on a crosswalk. All data sets were obtained from IPUMS (Integrated Public Use Microdata Series). For the U.S. Census, we use data from the one percent samples of the 1970, 1980, 1990 and 2000 Censuses and for the American Community Survey we use data from the 2005-2009 surveys. We start our CPS data in 1971 because the 1960 occupation codes were used in 1970.[12] There are 505 occupations identified in the 2000 occupational coding scheme and 501 identified in the 1990 coding scheme.[13] The main sample restrictions we implement for all our analyses are to focus on employed, working age individuals, 18 – 64, not living in group quarters, in the civilian labor force. We exclude observations for which occupation was imputed.[14] Sampling weights (where available) are used in all analyses.[15]

To construct our new gender-specific crosswalk, we pooled all 36 months of CPS data,

[12] The CPS uses the 1970 occupation codes from 1971 to 1982, the 1980 occupation codes from 1983 to 1991, the 1990 occupation codes for 1992 to 2002, and the 2000 occupations codes starting in 2003.
[13] Not every occupation is represented in the March CPS data in every year. Thus, the included occupations change slightly from year to year, but any resulting bias due should be minimal as, on average, 503 of the 505 occupations in the 2000 occupation codes are represented in each year.
[14] The percentage of observations that had imputed occupations ranged from 4.0% to 11.4% for various years in the Census/ACS data, and from 2.6 to 2.9% in the CPS data used in the crosswalk. The extent of imputation was similar by gender.
[15] Sampling weights are not provided for the 1970 and 1980 Census data.

retaining only those in the Outgoing Rotation Group, so that individuals are included only once in each year of data. After applying our sampling restrictions, the pooled monthly CPS sample had 534,958 observations; this can be compared to the 97,902 observations used to create the U.S. Census crosswalk (Scopp 2003). One compatibility issue that arises is that, in the CPS, separate data on three occupations ("legislators," "postmasters," and "judges") have been suppressed to maintain confidentiality and the incumbents included in other categories.[16] For these three occupations, we augmented our CPS-based crosswalk using aggregate employment information from the Census crosswalk.[17]

Although it would have been preferable to develop a crosswalk based on Census data for our Census-based analysis, as we have previously noted, the requisite data are unfortunately not available. We believe that a crosswalk based on CPS data is a reasonable alternative. Although Census data are generally preferred to CPS data due to the smaller size of CPS samples, as we have seen, by pooling 36 months of data for the outgoing rotation group we are able to base our crosswalk on a very large sample of observations. To check the comparability of the CPS crosswalk with the Census, we generated an aggregate (males and females combined) crosswalk from the CPS data and calculated the correlation between the conversion factors in the Census crosswalk and our CPS-based crosswalk. We obtained a coefficient of 0.95; this is a very high correlation, particularly given that the crosswalks are based on data from different years—the Census from 1990 and the CPS from 2000-2002—and

[16] Legislators and postmasters were included in "managers, all other" and "judges" were classified with "lawyers;" separate reporting of these occupations was suppressed beginning in 1996 (personal communication from Gregory Weyland of the U.S. Census Bureau, email, Aug. 25, 2010).
[17] The calculated indexes were virtually the same when, as an alternative, we reduced the number of occupations and combined individuals in these three occupations into the managers, all other, and lawyer categories.

might be expected to differ on that basis alone. This suggests that the CPS-based crosswalk can reasonably be applied to convert Census data to the 2000 codes.

The conversion factors developed by the Census for its crosswalks were based on a sample of cases from the 1990 Census that were recoded into the 2000 classifications. This sample did not necessarily provide enough cases for each 2000 occupational category "to make an accurate and meaningful conversion from 2000 back to 1990" (Scopp 2003, p. 5). Thus, the Census recommends using the Census crosswalk only for converting the codes forward, from the 1990 version to 2000 (Scopp 2003). However, we also provide some results using the Census crosswalk in the reverse direction in order to make some instructive comparisons; our conclusions regarding the usefulness of the crosswalk for studying occupational segregation by sex are not, however, dependent on this use of the crosswalk in the reverse direction. A CPS crosswalk, also based on aggregate employment (men and women combined), is available in versions for converting the codes both forwards and backwards.[18]

As noted above, only a few changes were needed to make the 1980 codes compatible with the 1990 classifications. Six pairs of occupations in 1980 are merged together in the 1990 codes and thus are combined. There were also two 1980 occupations that were each split into three separate occupations in the 1990 codes. To convert the 1980 data into the 1990 categories we redistribute the 1980 incumbents across the 1990 categories by assuming that the distribution by gender of workers across the three occupations in 1980 was the same as in

[18] See Tables 5 and 6, available at www.bls.gov/cps/cpsoccind.htm .

1990.[19] The same procedures were applied to the 1970 data that we had converted into 1980 codes using the gender-specific crosswalk provided by the Census for this purpose.[20]

Some small adjustments were also needed to make the data from the 2005-2009 ACS consistent with the full 2000 occupation codes because the number of occupations available in each year's data is slightly reduced due to privacy concerns. To make the codes consistent, we follow the same procedure that we used to make the 1970 and 1980 data consistent with the 1990 codes in the case of occupations that had split; that is, we redistributed the incumbents in the affected categories across the full set of 2000 codes by assuming that the distribution by gender of workers in the relevant occupations was the same as in the 2000 Census data. As a robustness check, we also examined the trends when we contracted the set of occupations to the number available in all years (including the 1980 census data and various years of the ACS) by combining occupational categories; the estimated indexes were virtually identical.[21]

Although the CPS-based, gender specific crosswalk was based on a large sample, especially given the extent of occupational segregation by sex, there are occupation cells with just a small number of men or women.[22] If a gender-occupation cell had five or fewer observations, we used the total number of workers in that cell (in place of the gender-specific number) in constructing the crosswalk. Our results were robust to experimentation with two other small occupation cutoffs (i.e., one or fewer and ten or fewer observations)—see Table

[19] There were also 18 occupations in the 1980 data that had either their title or their code changed but could all be matched with a corresponding 1990 category.
[20] The crosswalk is available at IPUMS, http://usa.ipums.org/usa/resources/chapter4/occ_70-80.pdf .
[21] There were 468 occupational categories after contraction.
[22] The U.S. Census had access to the full set of Census observations and was thus able to ensure that their dual-coded sample had at least 200 observations (of men and women combined) for each occupation.

A.1. The dual-coded dataset also had many transitions (i.e., recodes of 1990 occupational employment into specific 2000 occupational categories) that were based on small numbers of observations. We include all of the recorded transitions in our crosswalk, although results were similar when we dropped transitions with less than .05 percent of occupational employment (again, see Table A.1).[23]

4. Methods

Differences in the distribution of women and men across a wide number of occupational categories may be summarized by a segregation index. The most commonly employed measure is that developed by Duncan and Duncan (1955), and, for comparability with other studies, we employ that measure here. The index of segregation is computed as:

where m_{it} (f_{it}) is the proportion of all employed males (females) who are employed in occupation i at time t. This measure, generally expressed as a percentage, indicates the proportion of women (or men) that would have to change occupations for the occupational distribution of men and women to be the same. If the share of women in all occupations is the same as their share of all employment, then the segregation index is 0. Hence, a value of 0 indicates complete integration whereas a value of 100 indicates complete segregation.

When considering the mechanism that produces a decrease in the segregation index, we normally think first of a change in sex composition within occupations, as occurs, for

[23] This is the cut-off the BLS uses for inclusion in its published crosswalk, see Tables 5 and 6, available at www.bls.gov/cps/cpsoccind.htm .

example, when women enter predominantly male jobs in large numbers or, less frequently, men enter predominantly female occupations. However, as Gibbs (1965) first pointed out, the degree of occupational segregation also depends on occupational structure—the relative size of segregated versus integrated occupations. This implies that changes in the degree of segregation over time may occur as a byproduct of shifts in the occupation mix of the economy. So, for example, a secular decline in employment in predominantly male manufacturing occupations would cause a decrease in the index, even if "within occupation" segregation remained unchanged. Alternatively, an increase in the relative importance of predominantly female service occupations could mask the effects of increasing integration within occupations.

In order to better understand the sources of observed changes in the segregation index over time, we employ a decomposition method initially proposed by Fuchs (1975),[24] which decomposes the overall change in segregation into sex composition and occupation mix components. The sex composition effect measures how much the segregation index would have changed if just the percentage male (female) within occupations changed, but the relative size of each occupation remained constant; the occupation mix effect measures how much occupational segregation would have changed if just the relative size of occupations changed, but the sex composition of each occupation remained constant.

[24] Fuchs (1975) used this decomposition to analyze trends in segregation within the professions. Blau and Hendricks (1979) were the first to employ it to analyze trends across the labor force as a whole; versions of it have also been used by Beller (1985); Bianchi and Rytina (1986); Cotter et al (1995), and Blau, Simpson, and Anderson (1998). Note that we do not use the standardized index proposed by Gibbs (1965) because it entails making all occupations of equal size in order to net out the effect of occupational structure, in our view, giving too much weight to small, possibly unrepresentative occupations.

To compute these effects it is helpful to change the representation of how the occupational segregation index is calculated. If F_{it} (M_{it}) is the number of females (males) in occupation *i* and time *t*, and $T_{it} = F_{it} + M_{it}$ is total employment for occupation *i*, then the segregation index can be rewritten as:

$$S_t = (0.5)\sum_i \left| \frac{q_i T_{it}}{\sum_j q_j T_{jt}} - \frac{p_i T_{it}}{\sum_j p_j T_{jt}} \right|$$

where $p_{it} = F_{it}/T_{it}$ is the percentage of women in each occupation and $q_{it} = (1-p_{it}) = M_{it}/T_{it}$ is the percentage of men. For the change in segregation between periods 1 and 2, the sex composition and occupation mix effects are defined as:

$$\text{Sex Composition Effect} = \left[(0.5)\sum_i \left| \frac{q_{i2} T_{i1}}{\sum_j q_{j2} T_{j1}} - \frac{p_{i2} T_{i1}}{\sum_j p_{j2} T_{j1}} \right| \right] - S_1$$

$$\text{Occupation Mix Effect} = S_2 - \left[(0.5)\sum_i \left| \frac{q_{i2} T_{i1}}{\sum_j q_{j2} T_{j1}} - \frac{p_{i2} T_{i1}}{\sum_j p_{j2} T_{j1}} \right| \right]$$

5. Aggregate vs. Gender-specific Crosswalks

In this section, we examine the relative usefulness of the aggregate crosswalk provided by the Census Bureau and our CPS-based, gender-specific crosswalk. To do this, we initially focus on the key 1990-2000 period. Table 1 shows the segregation indexes for 1990 and 2000 based on (i) Census data and the Census Bureau aggregate crosswalk for 1990 occupational codes (column 1) and 2000 occupational codes (column 2) and (ii) Census data and our CPS-based, gender-specific crosswalk for 1990 occupational codes (column 3) and 2000

occupational codes (column 4). For purposes of comparison we also show the indexes for 1990 occupation codes computed based on actual CPS data (column 5)—recall that no conversions are needed for this period in the CPS.[25] Table entries based on crosswalked data are indicated in **bold**.

Looking first at the results based on the Census Bureau aggregate crosswalk in columns (1) and (2), we see that, *within each year*, the application of the crosswalk results in a *reduction* in the estimated amount of segregation. While, in principle, either the 1990 or the 2000 occupational codes could capture more or less segregation, the pattern in Table 1 is inconsistent with this interpretation because neither coding scheme consistently results in a higher or lower value of the index. Rather, the results suggest that there is a loss in segregation when the crosswalk is applied in either direction. Application of the crosswalk also yields implausible results regarding the change in the index over the 1990s: the index *fell* by 5.20 percentage points between 1990 and 2000 when the 1990 codes are employed, but *increased* by 1.51 percentage points when the 2000 codes are used. Comparing these results to the indexes obtained using actual CPS data and 1990 codes casts further doubt on the findings obtained with the aggregate Census crosswalk: the CPS data show a decrease in the index of 2.72 percentage points.

In contrast to the implausible results obtained for the aggregate crosswalk, findings based on the gender-specific crosswalk (see, columns 3 and 4) are quite plausible. For each year, the crosswalked values are similar to the actual values using the alternative year's occupation codes. Overall, the 2000 codes have a consistent effect of raising the amount of

[25] While the CPS adopted the 1990 codes in 1992, as noted above, the 1980 occupational codes may very easily be made compatible with the 1990 codes.

segregation captured, but the differences are not large. And, the change in segregation obtained using both the 1990 occupation codes (-2.28) and the 2000 occupation codes (-2.16) is quite similar to that estimate using actual CPS data and 1990 codes (-2.72).

Additional evidence that the gender-specific crosswalk yields more plausible results is provided in Table 2, which applies the aggregate and gender-specific crosswalks to the dual coded 2000-2002 CPS data. These data may be used to obtain true measures of occupational segregation in both the 1990 and 2000 occupation coding schemes for each year of data (see columns (1) and (2)). We then use column (2) as a benchmark to compare indexes based on alternative crosswalks to convert the data from the 1990 to the 2000 codes. Columns (1) and (2) again show that the 2000 occupation codes capture a slightly higher level of segregation, but that the two sets of occupation codes measure roughly the same level of segregation in each year. Column (3) shows the results of applying the Census, aggregate crosswalk and reveals that a significant amount of segregation is lost in doing so. In column (4), we apply our new CPS-based, gender-specific crosswalk and see that it recovers roughly the same amount of segregation as the actual dual-coded data: the difference between columns (2) and (4) is .15 percentage points or less.

One difference between the Census and CPS-based crosswalks, in addition to how they treat gender, is that they are based on different years. The Census crosswalk is based on 1990 data whereas the CPS data are from 2000-2002. So, the resulting estimates of segregation may differ at least in part because the occupation composition of the workforce changed between 1990 and 2000. To address this issue we created an aggregate crosswalk from the dual-coded CPS data. The last column in Table 2 shows that this third crosswalk performs even worse than

the Census-based crosswalk (column 3) in capturing the levels of occupational segregation that exist in the actual CPS data (column 2), thus indicating that it is the treatment of gender, rather than the base year employed, that accounts for the more plausible results found with the gender-specific, CPS crosswalk.

6. Trends in Occupational Segregation by Sex, 1970-2009

6.1 Overall trends

The results of applying the CPS-based, gender-specific crosswalk to the Census data are shown in Table 3, for both the 1990 and 2000 occupation codes. Under both coding schemes, we confirm prior results of a slowing pace for the decrease in segregation over the 1970-2000 period. Our results for the 2000s further indicate that that this pattern continued into that period. There were substantial decreases in the segregation index over the 1970s and 1980s—6.1 percentage points (1970s) and 4.3 percentage points (1980s), using the 2000 codes. However, there was only a 2.1 percentage point fall in the index over the 1990s, and just a 1.1 percentage point drop (on a decadal basis) over the 2000s.

Since it is possible that conclusions about the 2000s could be influenced by the particular ending year used (Beller 1985), the use of 2009 as the endpoint requires some justification in light of the recent, extremely serious, recession that began in December 2007 and ended in June 2009[26] and has been followed by a prolonged period of weakened employment. The recession has had uneven impacts on various occupations and this could

[26] National Bureau of Economic Research Business Cycle Dating Committee, available at http://www.nber.org/cycles/main.html .

distort our findings for 2009.[27] For example, the construction industry has been severely affected by the current recession, which will lower the influence of the highly segregated male occupations in that industry. However, as may be seen in Table 3, the segregation index is only .6 percentage points lower in 2009 than in the pre-recession year of 2007. Moreover, the housing bubble in the preceding boom, likely inflated the size of the construction industry, suggesting that a pre-recession year may not be ideal either and thus that 2009 may be an acceptable endpoint. This conclusion is reinforced by the results in Table 3 for each of the other years for which ACS data are available (2005-2008), which each show a similar small decrease in the segregation index on a decadal basis. As an additional check on our results, we also present annual indexes estimated using March CPS data for the entire 1971-2009 period in Figure 1. Again, the findings are quite similar, indicating a decrease in segregation for the whole period, but a considerable slowing of the rate of decline in segregation for the 1990s and 2000s.[28]

We now turn to a more detailed analysis of the trends in segregation, focusing for simplicity on the 2000 occupational categories. While the extent of segregation by sex remains substantial, the cumulative decrease in segregation over the whole 1970-2009 period has nonetheless been notable. Based on the 2000 codes, the index fell 13.44 percentage points from 64.48 percent in 1970 to 51.04 percent in 2009.[29] As noted earlier, it is possible to decompose the overall change in segregation into sex composition and occupation mix components. The sex composition effect measures how much of the overall change is due to

[27] See the articles in the April 2011 issue of the *Monthly Labor Review*.
[28] The CPS data do not show a slower decrease in segregation in the 1980s than in the 1970s.
[29] Declines were even larger using the 1990 codes. In contrast to the findings for later years, for 1970 and 1980, a higher level of segregation is obtained using the 1990 than using the 2000 codes.

changes in sex composition within occupations, and the occupation mix effect measures how much is due to changes in the relative size of occupations. Table 4 presents decomposition results for four time periods—1970-1980, 1980-1990, 1990-2000, and 2000-2009. The results indicate that both the sex composition and occupation mix effects contributed to the decrease in segregation in each decade, but, except in the 2000s (when the overall decline in the index was quite small), the sex composition effect accounted for the bulk of the trend towards desegregation. Table 4 indicates that the magnitude of the negative sex composition effect diminished noticeably over time. Thus, the slowing decline in the segregation index does indeed represent a reduction in gender integration within occupations rather than say a constant rate of decrease due to changes in sex composition disguised by an unfavorable trend in the mix of occupations.

Before turning to a fuller consideration of the changes in the employment distribution of women and men that contributed to the changes in sex composition within occupations, we briefly note the broad trends in occupation mix over the four decades. Based on a disaggregation of the occupation mix effect by major occupation category in each period (results not shown), similar to Blau, Simpson, and Anderson's (1998) results for the 1970s and 1980s, we find that, in each decade, the most important shifts in occupation mix that worked to reduce segregation were the decline in the relative importance of (i) particularly male but also female production occupations[30] and (ii) female office and administrative support jobs. A decrease in relative employment in other male blue-collar occupations also played a role. During the 2000s, the impact of these trends was offset somewhat by a growth in sex-

[30] In the 1970s, the contribution of female production jobs was larger than male production jobs.

segregated male and, particularly, sex-segregated female service jobs. The female jobs include a number of occupations in health care, household employment, and personal services.

Turning to the changes in sex composition within occupations, some insight into their dimensions for the period as a whole is provided by Table 5, which gives the distribution of workers (Panel 1) and occupations (Panel 2) by quintile of percentage female in the occupation for 1970 and 2009. For workers, we first show the distribution for 1970 and 2009 when occupations are defined by their *1970* gender composition, in order to see the reallocations of men and women across fixed categories. The distribution of workers is then shown for 2009 using the *2009* gender composition definitions. This allows occupations to be reclassified as the sex composition (percent female) within them is changed by the reallocation of workers across the 1970 categories.

As may be seen in the table, male and female workers were heavily concentrated in the most segregated male and female occupations in 1970. Fully 69.0 percent of men worked in heavily male (20 percent or less female) occupations and 45.8 percent of women were employed in heavily (more than 80 percent) female occupations. Holding the set of occupations fixed, we see a substantial decrease in the share of women in initially heavily female jobs (13.0 percentage points), but a much smaller decrease in the share of men in initially heavily male occupations (only 3.9 percentage points). This means that the decrease in segregation due to changing sex composition of occupations was primarily due to the movement of women into predominantly and moderately male occupations rather than a movement of men into predominantly and moderately female occupations (as defined by 1970

sex composition).[31] This is similar to results obtained in earlier studies[32] and is a factor underlying recent analyses of the uneven nature of changes in gender roles (England 2010). The impact of this redistribution of women across occupations on the sex composition of initially male occupations was further "leveraged" by the increase in the female share of total employment from 37.3 percent in 1970 to 47.6 percent in 2009.[33]

As a result, when we compare worker distributions across quintiles in 1970 and 2009 using the *2009* gender composition, the share of men in heavily male occupations is now substantially reduced—by 28.2 percentage points, and the number of occupational categories that may be classified as heavily male by 73. The decrease in the share of women in heavily female jobs of 12.6 percentage points is smaller, and, as we have seen, primarily due to the movement of women out of these jobs. Moreover, the number of occupational categories that may be classified as heavily female increased slightly (by 5). The declines in employment in the most heavily segregated male occupations were accompanied by an increase in the share of men in moderately male (20-40 percent female) occupations and of both men and women in relatively integrated (40-60 percent female) occupations. However, there was also a substantial increase in the share of women in moderately (60-80 percent) female occupations, of 6.3 percentage points, and the number of occupations so classified increased by 32. This suggests that, as women enter initially male or integrated occupations, some occupations may "tip" (Pan 2010) or "resegregate" (Reskin 1990) and become predominantly female.

[31] Data disaggregated by decade indicates that, not surprisingly, given the overall trends in occupational segregation, this inflow of women into male jobs was larger in the 1970s and 1980s than in the 1990s, and virtually died out in the 2000s.
[32] For example, Cotter et al (1995), Blau, Simpson, and Anderson (1998), and (for the 1970s) Beller (1985) and Bianchi and Rytina (1986).
[33] Calculated from our Census and ACS data sets.

Since the movement of women into traditionally predominantly male occupations played a major role in the reduction in occupational segregation over this period, Table 6 investigates which types of male jobs women were more likely to enter. It reports the results of a descriptive regression estimated for occupations that were heavily male (≤20 percent female) in 1970. The dependent variable is the change in the proportion female in an occupation between 1970 and 2009 minus the corresponding change in the proportion female in total employment. The explanatory variables are dummy variables for the major occupation categories, with production jobs as the omitted category. Table 6 shows the predicted changes in female representation in each occupation category (relative to the change in women's representation in total employment) based on this regression and tests whether the changes are significantly different from 0.[34] The major pattern that emerges is that women increased their representation in previously male white-collar and service jobs significantly faster than the increase in their share of total employment—for example 7.7 percentage points faster for the management category. In contrast, their representation in blue-collar and farming occupations increased significantly more slowly than the increase in their share of total employment—for example 9.8 percentage points more slowly for the construction and extraction category.

The consequences of this pattern of entry for the composition of heavily male (20 percent or less female) occupations are shown in Table 7. The first two columns show the percentage of men in each major occupation category that are in heavily male occupations. For example, the first entry says that 66.4 percent of all men in "management, business, and

[34] That is, for each occupation, the table reports the sum of the constant term and the regression coefficient for that occupation (or just the constant term in the case of the omitted category). This is easier to interpret than the regression coefficient itself, which is with reference to an arbitrarily selected reference category. The calculations are explained in more detail in the notes to the table.

financial" occupations in 1970 were in heavily male occupations. This had fallen to 10.2 percent by 2009. The last two columns show the distribution of all men that are in heavily male occupations across the major occupation categories. The first entry in the third column says that 13.9 percent of all men employed in heavily male occupations in 1970 were in occupations in the "management, business, and financial" category; by 2000, this was down to 6.2 percent.

Overall, Table 7 indicates that managerial, professional and service occupations all exhibited notable decreases in the share of men in the major occupation category employed in heavily male occupations over this period, as women entered a number of these jobs. Due to this entry, many traditionally male professions moved out of the heavily male category, including lawyers, physicians and surgeons, architects, economists, and veterinarians (to name a few). The remaining heavily male professional jobs tend to be in science, technology, engineering and mathematics (the STEM fields); the clergy also remains heavily male. Even in these areas, however, there have been increases in the representation of women in most cases. The reduction in the number of managerial jobs that are heavily male includes the movement off this list of chief executives, general and operation managers, and financial examiners, among others. In contrast, in the various blue-collar categories, there was virtually no reduction in the share of men in the major occupation category who were employed in heavily male occupations. And, with the exception of the production category, this share was extremely high in 1970, ranging from 86 percent in transportation and material moving to 100 percent in construction and extraction and installation, maintenance and repair occupations. As a result of these differences between white- and blue-collar occupations, heavily male jobs

have become increasingly blue collar. In 1970, about 53 percent of men employed in such jobs were in blue-collar occupations; this had increased to 71 percent by 2009.

6.2 Trends in segregation by age groups

We now turn to an analysis of trends in occupational segregation by age group designed to shed light on the extent to which the changes in occupational segregation we have observed for all workers are due to (i) new cohorts entering the workforce with different occupational distributions than their predecessors, (ii) occupational shifts of cohorts already established in the workforce, or (iii) a combination of both. To do this, we calculated the occupational segregation index for four different age groups (i.e., 25-34, 35-44, 35-54 and 55-64) for each year. While overall our analyses have been focused on the 18-64 year age range, we present these results for age categories beginning at age 25 in order to focus on individuals who have generally completed their schooling, and also to be able to follow ten-year age cohorts over time. These results are presented in the top panel of Table 8.

In 1970 and 1980, the level of segregation was quite similar across age groups. Looking across the columns, we see that occupational segregation declined for each age group over the 1970-2009 period. The decreases in segregation within age groups tend to follow the same pattern as the overall decline in segregation: segregation decreased most rapidly in the 1970s and 1980s, with the 1990s decreases tending to be smaller, and the 2000s decreases, if any, smaller still. Over the whole period, decreases were somewhat larger for the younger two than for the older two age groups. These decreases in segregation within age groups represent between-cohort declines in segregation and suggest that a primary mechanism by which occupational segregation was reduced throughout the period was through the entry of new,

less-segregated cohorts presumably with better training, stronger labor market commitment, and perhaps better labor market opportunities than their predecessors.

Further insight into the mechanism by which occupational segregation has been reduced may be obtained by following cohorts over time; we may get an indication of this by looking diagonally down the rows in the table. For example, the workers in age group 25-34 in 1970 are in age group 35-44 in 1980 and had a 4.7 point decline in occupational segregation.[35] This pattern of *within cohort* declines occurred for all age cohorts during the 1970s and 1980s, indicating that, during this period, women became less segregated by occupation as they aged. Thus, in the 1970s and 1980s, the periods with the largest decrease in segregation, the between-cohort declines in segregation were augmented by decreases in segregation within cohorts; thereafter, however, segregation levels remain fairly constant with age.

6.3 Trends in segregation by education groups

This section looks at the trends in occupational segregation by education to see how each education group fared over this period to update and confirm earlier results.[36] We computed the index separately for four education groups (i.e., less than high school, high school diploma, some college, and at least a college degree) for each year. These results are presented in the bottom panel of Table 8. Each year provides some evidence of a negative relationship between education and occupational segregation, with college educated women less segregated than high school graduates and high school dropouts, and those with a college

[35] We note that the within cohort results are only suggestive in that they may be affected by changes over time in the composition of the group. Further, the last period shown in the table, 2000-2009, is slightly less than a full decade, but we include it to get an indication of the trends over the 2000s.
[36] Jacobs (1999) provides estimates of occupational segregation by sex broken down by education level for 1971-1997.

degree less segregated than those with less education. As Jacobsen (1997) notes, this pattern implies that part of the overall decrease in occupational segregation is due to the increased educational attainment of the working age population. The dramatic gains in college education for women (Goldin, Katz, and Kuziemko 2006) are likely to have been especially important.

While rising educational attainment has contributed to the decrease in occupational segregation, there have also been considerable declines over the 1970-2009 period in the extent of segregation within educational categories, with the exception of those with less than high school. Table 8 further indicates that, as reported by Jacobsen (1997) and Jacobs (1999) for earlier periods, the decreases in segregation have been positively related to education and the declines have been especially pronounced for college graduates. Between 1970 and 2009, the segregation index declined by fully 21.4 percentage points among those with college degrees, compared to decreases of 9.9 percentage points for those with some college, 8.5 percentage points for those with just a high school and 5.5 percentage points for high school dropouts. As Jacobs (1999) points out, the considerable success of women in entering formerly male managerial and professional occupations has likely fueled this dramatic decline in segregation for highly educated women. However, progress has been much less in integrating blue-collar jobs, likely retarding reductions in occupational segregation for less-educated women.

7. Conclusion

In this paper, we used Census data to analyze the trends in occupational segregation in the U.S. workforce over a nearly forty-year period. This required us to bridge the major change

in the Census occupational coding system that occurred in 2000. We present evidence that the crosswalk provided by the Census to convert data for previous years into the 2000 occupational categories is of limited usefulness for studying trends in occupational segregation by gender because it is based on aggregate employment data (i.e., data for men and women combined) and thus provides the same conversion factors for men and women. This leads to classification errors that, when aggregated across a large number of occupational categories, can bias the segregation estimate downwards substantially. A major contribution of this paper is to develop a gender-specific crosswalk, which has separate conversion factors for men and women, using dual-coded Current Population Survey data for 2000-2002. We show that this crosswalk more accurately captures the trends in occupational segregation. In general, a gender-specific crosswalk may be expected to yield more accurate results in any application where there is a need for occupational data for men and women separately. These data problems can be avoided in the future, if, when occupational coding changes occur, the Census Bureau publishes a gender-specific cross walk, as it did for the major occupation coding changes that occurred between 1970 and 1980, but did not for the most recent changes to the occupational coding system. If, in addition, the Census makes a dual-coded data file available, crosswalks may be generated by users along any number of dimensions.

We then applied our gender-specific crosswalk to study the trends over the 1970-2009 period, providing the first results for trends over the 2000s and for all periods using the new 2000 occupational codes. Consistent with previous research, we find that that the decline in occupational segregation by sex has indeed been slowing, and our results indicate that, by the 2000s, the decrease in segregation had become extremely modest. Consistent with past

research on earlier periods, we find that the considerable reductions in occupational segregation achieved over the period as a whole were primarily due to women entering formerly predominantly male occupations (particularly white collar and service jobs), rather than to men entering formerly predominantly female occupations. There was no evidence of similar female gains in blue-collar occupations. Consistent with this pattern, we also confirm earlier findings that reductions in occupational segregation were correlated with education, with the largest decreases among college graduates and very little change in the extent of occupational segregation among high school dropouts. In addition, our results suggest that, for the 1970s and 1980s, when the decline in segregation was particularly pronounced, occupational segregation was reduced both through the entry of new cohorts of women, presumably better prepared and/or encountering less labor market discrimination than their predecessors, but also by within cohort decreases in segregation.

A central finding of this paper is to confirm the results of previous research for earlier periods and occupational coding schemes that the decline in occupational segregation by sex has been slowing. It is difficult to predict whether or when a more robust decrease in segregation will resume. However, our analysis suggests that for it to do so, women would need to begin to make significant inroads into areas where they have not so far, especially predominantly male blue-collar jobs, and continue to build on their gains in STEM fields; and/or men would need to enter predominantly female occupations in much larger numbers than they have in the past.

A large entry of men into predominantly female occupations is unlikely, in our view; as long as such jobs continue to pay less for workers with similar characteristics, men have little

incentive to enter them in large numbers. This might change somewhat, depending on the long-term impact of the recent recession on male blue-collar jobs. Encouraging the entry of women into areas where they are under-represented, appears more promising. With respect to the STEM fields, enhancing the performance of girls and young women in mathematics is a reasonable target of policy. How to do so remains an active area of inquiry, but it is encouraging that, although a gender gap in math scores on high school math achievement tests and the SATs remains, it has declined as the high school course work of young men and women has grown more similar (Goldin, Katz, and Kuziemko 2006; Blau, Ferber, and Winkler 2010, Ch. 6) and that gender differences in math scores vary considerably across countries (Guiso et al 2008). In addition, in considering these and other occupations, considerable research suggests that, while there are gender differences in preferences and beliefs (which may be socially influenced) that may affect occupational choices (e.g., Bertrand 2010; England 2010), there are also obstacles (some subtle or structural in nature) to women's entry and advancement in traditionally male fields (e.g., Reskin and Bielby 2005; Blau, Ferber, and Winker 2010, Ch. 7, Valian 1998). These have been and remain appropriate targets for government anti-discrimination efforts and voluntary policies adopted by firms. However, there is still much we do not know, and additional research remains important in more fully understanding the causes and consequences of occupational segregation, as well as the efficacy of policies to address it. We believe that the crosswalk that we have developed to bridge the changes in the Census occupational coding scheme that occurred in 2000 will be useful in this effort.

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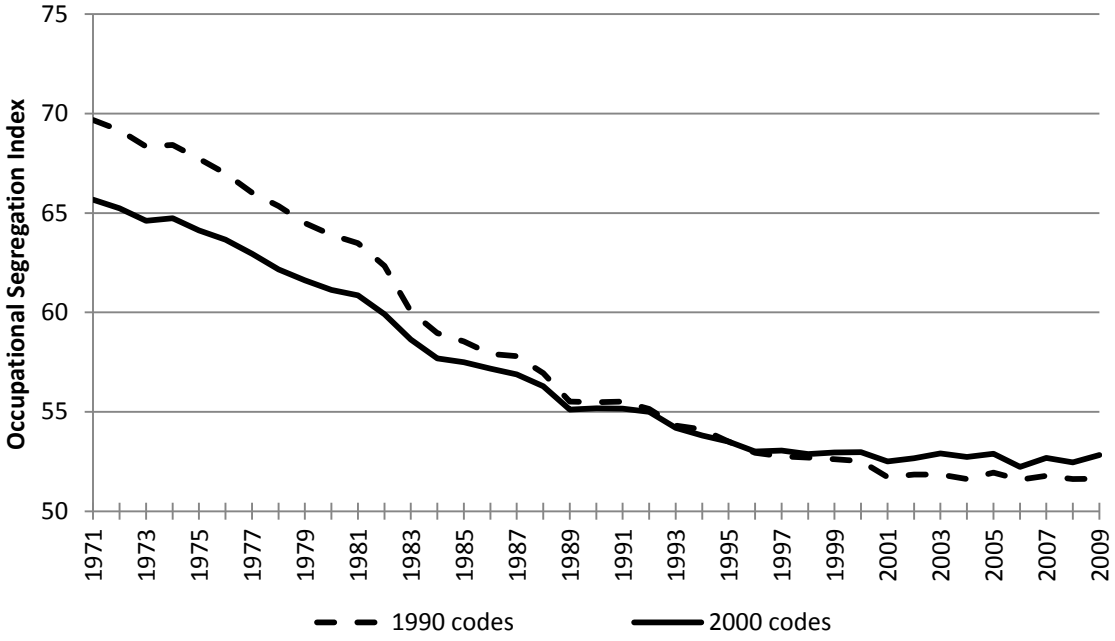
Figure 1: Trends in Occupational Segregation Using Gender-Specific CPS Crosswalk (March CPS Data)



Notes: Estimates for years 2000-2002 employ actual (noncrosswalked) data from the BLS dual-coded data set.

Table 1: Occupational Segregation Indexes by Gender Using Alternative Crosswalks, 1990 and 2000

	Census Data, Aggregate Crosswalk		Census Data, Gender-Specific Crosswalk		CPS Data (No Crosswalk)
	1990 Codes	2000 Codes	1990 Codes	2000 Codes	1990 Codes
Year	(1)	(2)	(3)	(4)	(5)
1990	53.79	**50.52**[1]	53.79	**54.08**[2]	55.48
2000	**48.50**[1]	52.03	**51.51**[2]	52.03	52.76
change 2000-1990	-5.29	1.51	-2.28	-2.16	-2.72

Note: Indexes based on crosswalked data in **bold**.

[1]Data converted using US Census Bureau crosswalk, see Scopp (2003).
[2]Data converted using the authors' gender-specific, CPS-based crosswalk.

Table 2: Occupational Segregation Indexes by Gender Using Alternative Crosswalks and the Dual-Coded CPS Data, 2000-2002

Year	1990 Codes (1)	2000 Codes (2)	2000 Codes via Aggregate Census Crosswalk (3)	2000 Codes via Gender-specific, CPS Crosswalk (4)	2000 Codes via Aggregate CPS Crosswalk (5)
2000	52.02	52.46	48.60	52.52	46.35
2001	51.77	52.63	48.20	52.47	46.12
2002	52.02	52.59	48.41	52.54	46.20

Table 3: Occupational Segregation Indexes by Gender from 1970-2009 using the Gender-Specific, CPS-based Crosswalk (Census Data)

	2000 codes		1990 codes	
Year	Index	Change[a]	Index	Change[a]
1970	64.48		68.69	
1980	58.36	-6.12	60.00	-8.69
1990	54.08	-4.29	53.79	-6.20
2000	52.03	-2.05	51.51	-2.29
2005	51.83	-0.40	51.33	-0.36
2006	51.95	-0.14	51.47	-0.06
2007	51.67	-0.51	51.20	-0.43
2008	51.69	-0.42	51.26	-0.31
2009	51.04	-1.10	50.67	-0.92

[a]Average annual change X 10. For years 2005-2009, change is calculated with reference to the year 2000.

Notes: Both the Census data and the gender-specific crosswalk are for employed individuals aged 18-64 for whom occupation was not imputed. As explained in the text, total employment was used for crosswalk cells with five or fewer men or women.

Table 4: Decomposition of Overall Changes in Occupational Segregation, 2000 Occupation Codes

		Sex Composition		Occupation Mix	
Time Period	Total Change[a]	Absolute[a]	% of Total	Absolute[a]	% of Total
1970-1980	-6.12	-4.91	80.3%	-1.20	19.7%
1980-1990	-4.29	-2.97	69.4%	-1.31	30.6%
1990-2000	-2.05	-1.17	57.3%	-0.87	42.7%
2000-2009	-1.10	-0.51	46.6%	-0.59	53.4%

[a]Average annual change X 10.

Note: The separate parts may not equal the whole due to rounding.

Table 5: Distribution of Workers and Occupations by Quintile of Percentage Female of the Occupation, 2000 Occupation Codes

	Women as Percent of Total in Occupation					
	0-20	20-40	40-60	60-80	80-100	Total[a]
I. Distribution of workers						
	Defined by 1970 gender composition					
A. 1970						
Men	69.0	14.6	9.5	4.3	2.6	100.0
Women	9.7	9.5	14.8	20.2	45.8	100.0
Total	46.9	12.7	11.5	10.2	18.7	100.0
B. 2009						
Men	65.1	15.0	9.1	7.2	3.6	100.0
Women	18.1	15.7	14.5	18.9	32.8	100.0
Total	42.7	15.3	11.6	12.8	17.5	100.0
	Defined by 2009 gender composition					
A. 2009						
Men	40.8	26.2	18.7	11.0	3.2	100.0
Women	4.1	12.9	20.8	29.1	33.2	100.0
Total	23.3	19.9	19.7	19.6	17.5	100.0
II. Distribution of occupations						
	Defined by 1970 gender composition					
A. 1970						
Percentage	53.3	19.4	10.1	9.9	7.3	100.0
Number	269	98	51	50	37	505
	Defined by 2009 gender composition					
B. 2009						
Percentage	38.8	18.6	18.0	16.2	8.3	100.0
Number	196	94	91	82	42	505

[a]Rows may not sum to column totals due to rounding.
Note: Intervals are defined as follows: 0-20: $0 \leq pf_i \leq 20$; 20-40: $20 < pf_i \leq 40$; … 80-100: $80 < pf_i \leq 100$, where pf_i is the percent female for occupation i.

Table 6: Changes in Percent Female in Male (<= 20% Female) Occupations Between 1970 and 2009 Across Major Occupation Categories, 2000 Occupation Codes

Major Occupation	Chge in Pct Female	
Management, Business, and Financial	7.655	***
	(1.044)	
Professional and Related	6.504	***
	(1.153)	
Service	3.195	**
	(1.286)	
Sales and Related	11.145	***
	(1.207)	
Office and Admin. Support	7.110	**
	(2.609)	
Farming	-9.159	***
	(2.780)	
Construction and Extraction	-9.758	***
	(1.095)	
Installation, Maintenance and Repair	-8.869	***
	(1.308)	
Transportation and Material Moving	-5.368	***
	(1.072)	
Production	-7.117	***
	(0.000)	
r2	0.592	
N	269	

Notes: * p<.10, ** p<.05, *** p<.01. Standard errors are in parentheses. Based on regression results where the dependent variable is defined as the change in proportion female within the occupation minus the change in proportion female in total employment. The explanatory variables are dummy variables for the major occupation categories, with production occupations the omitted category. The table entries reported for major occupation groups are b_{OCC} + Constant, where b_{OCC} is the coefficient on the indicated major occupation category. Male occupations are those with percent female of 20 percent or less in the base year. To correct for heteroskedasticity, regressions were weighted by $(n_j*n_k)/(n_j+n_k)$, where n gives the sample size in the occupation cell in the indicated year and j and k are the years spanned by the period defining the dependent variable.

Table 7: Distribution of Men in Heavily Male (<= 20 Percent Female) Occupations by Major Occupation Category, 1970 and 2009, 2000 Occupation Codes

	Share of men in major occ category in heavily male occs		Share of men in heavily male occs in this major category	
Major Occupation Category	1970	2009	1970	2009
Management, business, and financial	66.4	10.2	13.9	6.2
Professional and related	35.6	10.5	11.5	9.2
Service	32.2	13.9	8.3	10.0
Sales and related	45.0	0.9	9.0	0.4
Office and administrative support	6.6	1.6	2.2	0.9
Farming, fishing, and forestry	96.5	91.9	2.3	2.4
Construction and extraction	100.0	99.4	13.7	24.9
Installation, maintenance, and repair	100.0	100.0	10.4	15.6
Production	41.8	38.6	13.8	9.6
Transportation and material moving	86.2	86.9	14.7	21.0

Table 8: Trends in Occupational Segregation From 1970-2009 by Age and Education Categories, 2000 Occupation Codes

Age Categories	1970	1980	1990	2000	2009
25-34	64.01	56.82	53.24	51.00	51.88
35-44	65.05	59.30	54.24	53.29	52.02
45-54	64.69	60.18	56.47	54.06	53.54
55-64	65.29	60.27	57.35	56.36	54.01
All	64.48	58.36	54.08	52.03	51.67

Education Categories	1970	1980	1990	2000	2009
Less Than HS Diploma	64.73	60.53	57.81	57.19	59.19
HS Diploma	67.17	63.36	60.64	59.76	58.63
Some College	64.30	59.01	56.57	55.98	54.44
At least a college degree	61.79	51.69	44.81	41.66	40.35
All	64.48	58.36	54.08	52.03	51.04

Table A.1: Occupational Segregation Indexes by Gender from 1970-2009 Testing Various Methods for Applying the Crosswalk, 2000 Occupation Codes

	Small Occupation Cutoffs				Small Transition Cutoff	
	<=1		<=10		<.05%	
Year	Index	Change[a]	Index	Change[a]	Index	Change[a]
1970	64.49		64.46		64.75	
1980	58.41	-6.08	58.34	-6.11	58.56	-6.19
1990	54.08	-4.33	54.07	-4.28	54.18	-4.38
2000	52.03	-2.05	52.03	-2.04	52.03	-2.15
2009	51.04	-1.10	51.04	-1.10	51.04	-1.10

[a]Average annual change X 10.

Notes: All calculations are made as in Table 3 except where specifically noted. For the small occupation cutoffs, if a gender-occupation cell did not have the indicated number of observations, the observations for both sexes combined were used to generate the crosswalk information for that occupation. For the small transition cutoff, transitions with less than .05 percent of occupational employment were dropped. The transition percentages were then recalculated so they equaled 100%.