Trends in occupational segregation: What happened with women and foreigners in Germany?

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ABSTRACT

We use recent German survey data for over three decades to analyze long-run trends in occupational segregation. Segregation declines for both women and foreigners in Germany. However, using different ISCO classifications in given years, segregation tends to be a rather stable phenomenon.

Keywords: Occupational Segregation, Gender, Immigration, Dissimilarity Index, Karmel-MacLachlan Index

JEL Classification: J16, J15, J24

1. Introduction

We use the recently publishes ALLBUS data set for the years of 1980 to 2012 to reassess the topic of occupational segregation in Germany. While we calculate the dissimilarity and the Karmel-MacLachlan indexes for women and foreigners, we re-examine the finding of Blau et al. (2013) of job classification effects on segregation intensities. The descriptive paper is structured as following. In section two we give a brief review of the literature. In the section three and four we describe our estimation strategy and the data set. We report our estimation results in section five and end with a brief conclusion in section six.

2. Literature review

Following the definition of Alonso-Villar and del Rio (2014) we understand occupational segregation as a non-similar distribution of a specific sub-population over organizational units. Here women or immigrants can be overrepresented or underrepresented over a set of given jobs, relative to men or natives. It is well known that men and women differ in their jobs. We consider that typical male or female jobs exist, e.g. construction jobs for men or caring jobs for women.

A series of papers show that the phenomenon of segregation exists, but it declines over time (e.g. Anker 1997, Blau and Hendricks 1979). Tomaskovic-Devey et al. (2006) and Alonso-Villar et al. (2012) use different U.S. data to analyze the long-run decline of segregation for women and immigrants. Blau et al. (2013) show for the U.S. that different coding of job classifications has an impact on the calculation of segregation measures. They show that gender related segregation decline over time, but not as low as calculated without the adjustment for coding differences.

There is evidence that Germany has a segregated labor market, as well. Jarman et al. (2012) compare thirty industrialized countries, while Germany is on rang number nine; the three Scandinavian countries have the highest levels of gender segregation. Hausmann and Kleinert (2014) show declining trends for nearly four decades. Humpert (2014) analyzes occupational segregation since the German unification in 1990. Here women from the former eastern socialistic part of the country are higher segregated over specific jobs than in the western democratic part.

In another paper Humpert (2013) shows that foreigners in Germany differ in their earning situation relative to natives.

3. Methodology

For our analysis we use a Stata routine made by Gradín (2014) to compute several segregation indexes. This routine offers the calculation of a large set of several segregation measures, such as the dissimilarity or Duncan index, Karmel-MacLachlan index, Hutchens squared root index, Mutual Information, or Gini coefficient. For the algebraic description of the measures we follow the concept of Gradín (2014). We start with a given population of N workers distributed across $T>1$ organizational units with $N = \Sigma_{j=1}^{T} n_j > 0 \, ; n_j \geq 0$ being the total number of individuals in the jth occupation $j = (1, \ldots T)$. We also consider an exhaustive partition of the population into two groups, such as men and women, or natives and immigrants $n = \left(n^{1}, n^{2} \right) = \left(n_{1}^{1}, \ldots, n_{T}^{1}, \ldots n_{T}^{2} \right)$. Each group has size $N^{i} = \Sigma_{j=1}^{T} n_j^i > 0$, where $n_j^i \geq 0$ is the number of members of the ith group $(i = 1,2)$ in jth occupation, with $N = N^{1} + N^{2}$. In the first step, we use the dissimilarity index composed

by Duncan and Duncan (1955) to compute the overall segregation. See equation (1) for the formula of dissimilarity index: $D(n^{1},n^{2}) = 1/2\Sigma_{j}^{T} = 1(n_{j}^{2}/N^{2} - n_{j}^{1}/N^{1})$ (1).

In figures 1 and 2 we show illustrative how segregation develops over time. In the second step we try the same approach with the Karmel-MacLachlan index composed by Karmel and MacLachlan (1988). See equation (2) for the formula:

$$KM(n^{1},n^{2}) = 2(N^{1}/N \quad N^{2}/N)D(n^{1},n^{2})$$ (2). These results are shown in figures 3 and 4.

4. Data

We use the recently published accumulated German General Social Survey called GGSS, respectively ALLBUS in German spelling, provided by the data distributor GESIS (ALLBUS 2014). For the time range of the years 1980 to 2012, we have 18 waves of observations. In our date we have information for 57,723 individuals with 1,744 variables. Three of them are categories for job classifications, such as ISCO68, ISCO88, and ISCO08. Unfortunately, not every classification is available for every year. While job specific information are included for the hole time span, there is the limitation that the information about German or foreign citizenship is available not before 1991. This is shown in table 1.

Table 1. Time and Classifications

Classification	Example Gender (Figure 1)	Example Immigration (Figure 2)
ISCO 1968 (n=22,514)	1980 to 2010	1991 to 2010
ISCO 1988 (n=18,186)	1992 to 2012	1992 to 2012
ISCO 2008 (n=1,830)	2012 only	2012 only

5. Results

In this section we present our computed results of the two indexes. We show how segregation has developed over time, and what happens if we adjust for more actual job classifications. Generally spoken, each example of segregation shows a declining trend. However, the intensity of segregation is higher for women. But by changing the referencing job classification the picture turns into a relatively stable trend over time.
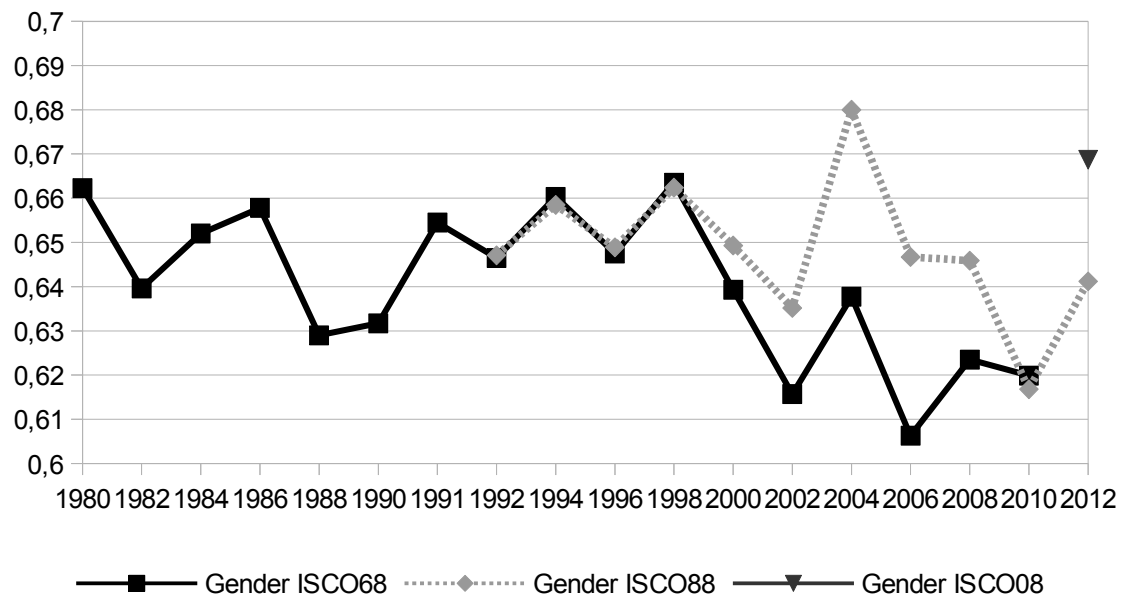
Figure 1. Occupational Segregation (Gender), D Index

At first we report our findings of the dissimilarity index. In figure 1 we show the results of declining gender specific segregation. The bold black line represents the classification ISCO 1968, and the gray dotted represents ISCO 1988. There is single data point in dark gray in the year 2012. This is a value computed for the recent ISCO 2008 classification. After the year 1998 the scissor between the ISCO groups 1968 and 1988 opens. Up to that point of time segregation is underestimated by the older job classification. For the years 2012 we show the same effect for the new ISCO 2008 and the two others.
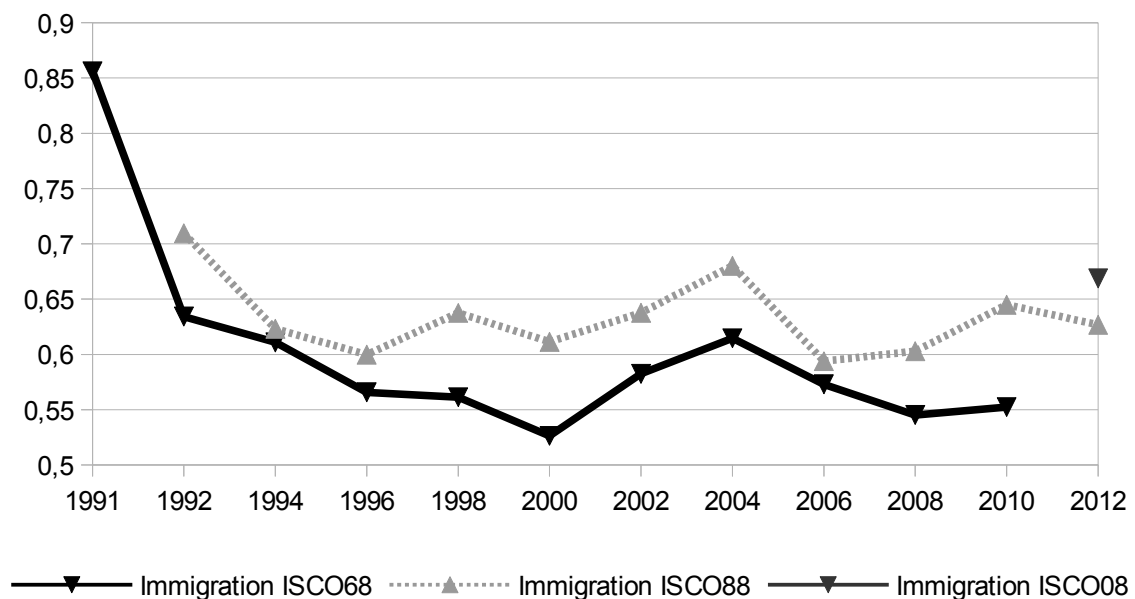
Figure 2. Occupational Segregation (Immigration), D Index

Similar to the results presented above, immigrant specific segregation declines over time. By analyzing the job classification, segregation is always underestimated by each of the older ISCO classifications. This is presented in figure 2 for the dissimilarity index.
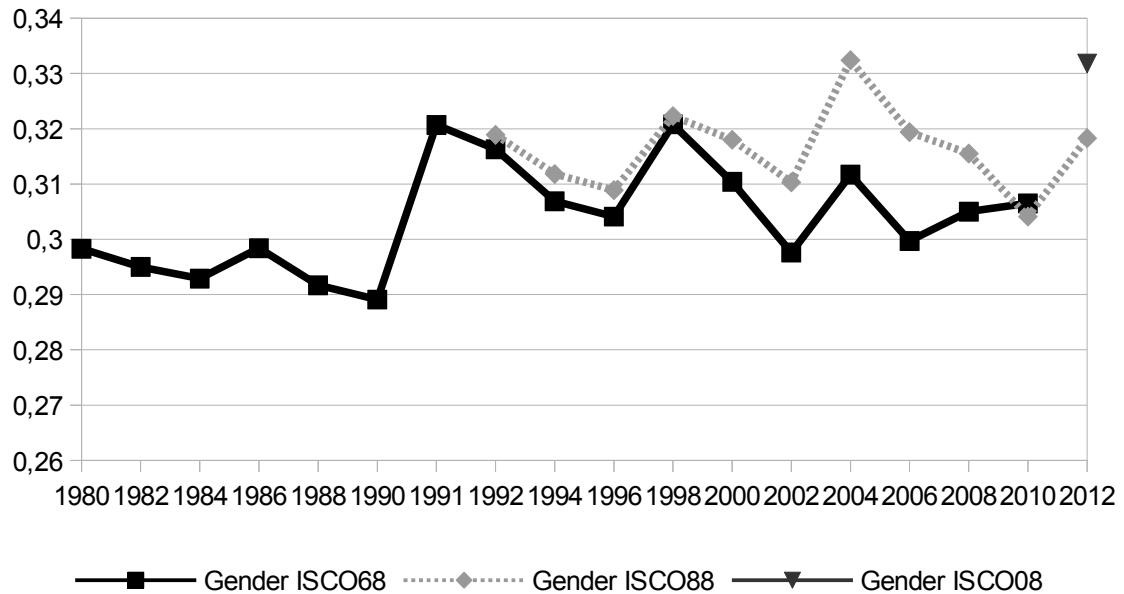

Figure 3. Occupational Segregation (Gender), KM Index

Again we reassess the same approaches with the Karmel-MacLachlan index. In figure 3 we present declining gender segregation since 1991. Concerning the job classifications we show a slight opening of the scissor in 1992 and a more intensive opening in 1998. Over time the newer job classification demonstrates a higher level of occupational segregation for women. The picture is even more impressive in figure 4, where immigration specific segregation is presented once again. Immigrant specific segregation decreases since 1996, re-increases in 2002, and decreases again in 2006. While the older ISCO classifications 1968 and 1988 are relatively similar, the newest classification ISCO 2012 shows a tremendous re-increase. It is interesting that the 2012 value is rather identical for women and foreigners.
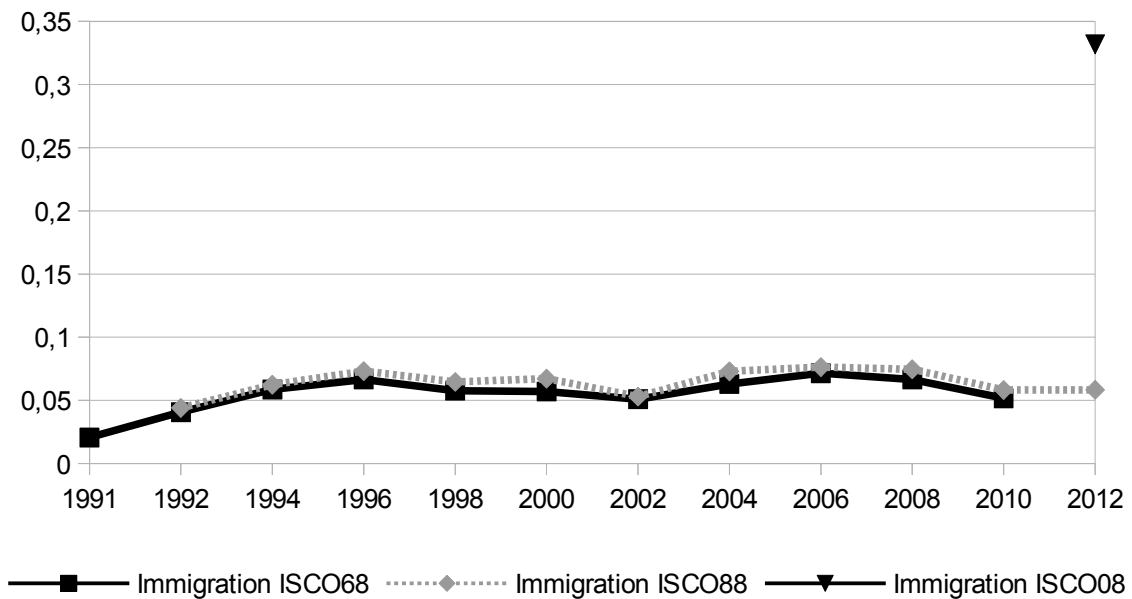
Figure 4. Occupational Segregation (Immigration), KM Index

Our illustrative findings hold for the other measures provided by the routine (Gradín 2014) as well. For robustness reasons we tried the same approach with aggregated job information. Here, segregation is getting lower because of higher levels of aggregated data and less heterogeneity between occupations. However, the pattern presented above remains.

6. Conclusions

To sum up, we use German survey data for over three decades to analyze long-run trends in occupational segregation. We present two key findings of our paper. At first we show that segregation declines in general, as long as we use the same ISCO classification over time. For both groups, women and foreigners, the values decline over thirty years. However, the intensity of segregation is higher for women. The combination of the findings can be interpreted that way, that female immigrants may foster a double burden of occupational segregation. The topic is important, because occupation segregation and the gender wage gap are both relevant to the economic security of women and the economy itself. A systematical exclusion of women and immigrants from certain jobs implies a waste of human capital resources.

The second result is a more statistical finding. We re-examine the findings of Blau et al. (2013) and show that the choice of a given ISCO classifications has an effect on the intensity of segregation in a given year. While we use all three of them, ISCO 1968, 1988, and 2008, we show that the always most actual classification available let re-increase segregation on a relatively stable level.

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