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Abstract

It is well known that women and men tend to work in different occupations, and generally held that this disadvantages women. In order to understand how far this occupational segregation entails gender inequality it is necessary to examine the vertical and horizontal dimensions of the segregation. The horizontal dimension measures difference without inequality while the vertical dimension measures the extent of the occupational inequality. Two measures of vertical inequality are used: pay and social stratification (CAMSIS). Measurements over a number of industrially developed countries show the expected male advantage with regard to pay. However, contrary to popular beliefs, women are consistently advantaged in terms of stratification. Also, it is found that the position of women is more favourable where the overall segregation is higher – the lower the male advantage on pay and the greater the female advantage on stratification.

Keywords

cross-national, dimensions, gender segregation, inequality, pay, stratification

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It is well established that a significant amount of occupational gender segregation exists in all societies, though the extent varies. That is, to varying degrees, women and men work in different occupations. There have been a number of important studies exploring cross-national differences in segregation levels (e.g. Anker, 1998; Charles and Grusky, 2004; Rubery and Fagan, 1995; Tomaskovic-Devey, 2006). There is almost a consensus that it is not segregation itself that is important, but rather the inequality that may be associated with it. The discussion of segregation has been held back, however, by the inability to effectively conceptualize the inequality dimension of any particular segregation level.

This article provides the first systematic analysis of the vertical and horizontal dimensions of occupational gender segregation in a substantial range of industrial countries. Considerations of the effects of segregation patterns on inequality have been raised previously. However, with the limited exception of the European Commission study of 2009,¹ there have been no studies in which horizontal and vertical segregation have been operationalized in such a way as to allow consistent analysis of the extent to which the occupational separation of women and men entails varying levels of inequality across countries. We present a rigorous measurement of the cross-national differences in gender segregation in 30 countries. Only two of these countries, the USA and UK (Blackburn and Jarman, 2006), have previously been examined in terms of the vertical and horizontal dimensions of segregation. There have been many more studies of vertical segregation to analyse gender inequality (e.g. Blau and Ferber, 1992; Boyd, 1990; Charles, 1992; Charles and Grusky, 2004; Faber, 1990; Fox and Suschnigg, 1989; Jacobs and Lim, 1992; Treiman and Roos, 1983) but they have not treated the inequality as a dimension of segregation. There have been very few studies of horizontal segregation, though the word 'horizontal' has often been used in a non-mathematical way which creates confusion, as explained below. We analyse the relationships between segregation and its component dimensions as they vary across countries.

The Relationship between Gender Inequality and Gender Segregation

For over a century, researchers have linked occupational feminization to disadvantaged outcomes in terms of pay, prestige, power and attractiveness of the occupation concerned, both for the women entering the occupation, and also for the occupation as a whole (Acker, 1990; Reskin and Roos, 1990; Standing, 1989, 1999; Webb, 1891). This relationship is not very surprising in situations where women do not have the same legal rights as men, are much less educated and trained, and are blocked from entering good quality occupations by a whole host of barriers such as lack of affordable daycare or even marriage bars. A change in the gender composition of an occupation has often been interpreted as a signal that employers are trying to take advantage of unprotected vulnerable workers (historically, often women as a group), and that the nature of the resulting employment bargains have the consequence of lower levels of pay, longer hours and more exploitation as well as a loss of social status in the occupation. This explanation is the most dominant and influential explanation of the consequences of segregation. Its strength is that it is firmly rooted in the ways in which the powerful can turn labour market participants into competitors for jobs, and use gender categories to provide inferior occupational rewards. The

weakness of this argument, however, is that it presents gender as a unitary entity. Many gender theorists argue that sociologists need to explore the complexities and intersections of categories such as gender, class, age, ethnicity, nationality and sexual orientation in order to provide much more accurate and nuanced explanations of social outcomes (Hekman, 1990; McCall, 2001). With specific reference to occupational gender segregation, it has been shown that changes in gender composition of an occupation can involve a shift in the class composition of new entrants, with better educated middle-class women replacing the working-class men as the occupation feminizes (Bottero, 1992). Such research suggests that gender transitions may also intrinsically involve social class transitions, and that feminization may be viewed as having positive rather than negative outcomes as women sometimes bring their superior class position and higher education as resources to the occupation. Given the myriad of progressive legislative and other changes that have occurred over the past 50 years to raise women's status in societies generally (and not disregarding the setbacks, backlashes and the work still to be done), it is important that research on gender segregation and its consequences considers the possibilities of more diverse and contradictory outcomes than has been the case in the past.

Academic literature suggests the following hypotheses about occupational feminization: (1) feminization produces largely negative outcomes (Acker, 1990; Perales, 2010; Reskin and Roos, 1990; Standing, 1989, 1999); (2) feminization has neutral outcomes or very subtle effects (Adams, 2005; Boulis and Jacobs, 2008); and (3) feminization creates differences which may be viewed as positive, such as more flexible work hours (Standing, 1989), or a greater service orientation to clients (Vehviläinen et al., 2010).

In this article, we present an analysis of occupational segregation which provides a complex theoretical approach involving the separation of the economic and social aspects of feminization, and takes advantage of the availability of excellent quality occupational data in order to produce a general overview of the impact of gender segregation in today's labour markets and to work towards an analysis which captures the complexity of modern feminization of occupations. We use methodological advances involving (i) a clearer conceptual operationalization of the critical dimensions of 'vertical' and 'horizontal' segregation, and (ii) separate analyses for two important aspects of occupational outcomes – pay and stratification level. We find that the impact of feminization continues to have serious ramifications in the economic realm for pay inequalities between men and women. However, in the social realm when considering position in social stratification, women as an entire group do better than men as an entire group. We revisit the implications of this finding in the conclusion, but first we develop the argument and present the analysis on which these findings are based.

The Dimensions of Segregation

We introduced the concept of dimensions of segregation in 1997 (Blackburn and Jarman, 1997) and have used it in several subsequent articles (Blackburn and Jarman, 2004, 2005, 2006; Blackburn et al., 2000, 2001, 2002; Brooks et al., 2003). This approach in terms of vertical and horizontal dimension has been usefully applied to other contexts including ethnicity (Blackwell and Guinea-Martin, 2005) and a single corporation, the BBC (Browne, 2006). However, despite extensive coverage of other aspects of our work in many excellent

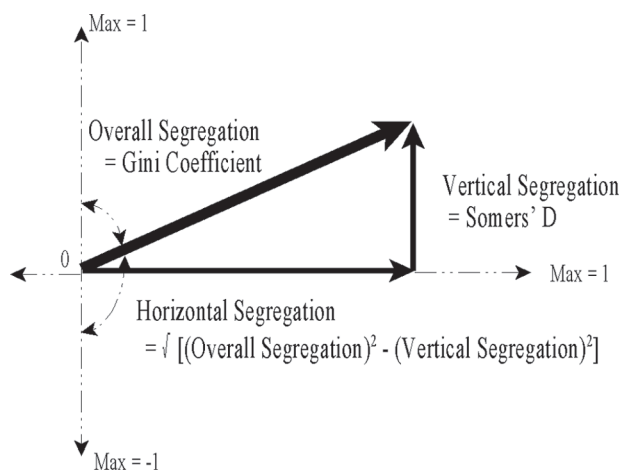


Figure 1. The dimensions of segregation

discussions of occupational segregation, there has been a surprising lack of discussion of this fundamental theoretical and methodological approach. Therefore we briefly set out the salient points, before going on to apply the approach to our set of industrial countries.

The essential point about dimensions is that they are components of segregation. Thus, segregation may be seen as having two component dimensions, a vertical one measuring inequality and an orthogonal horizontal one measuring difference without inequality. This means that the vertical dimension, and only the vertical dimension, measures the extent of inequality entailed in the occupational segregation. The horizontal dimension measures the extent to which women and men are neither advantaged nor disadvantaged by working in different occupations. Then the resultant of these two dimensions is segregation as generally understood, which is also known as ‘overall segregation’ to distinguish it from vertical segregation and horizontal segregation (Blackburn et al., 2000). The fundamental point is that the two dimensions together constitute the overall segregation, and so all three must be measured in strictly comparable ways, which means using the same metric. Although the conceptualization of segregation has rarely included a consideration of the dimensions, an adequate understanding of the nature and significance of segregation requires the measurement of its component dimensions.

Figure 1 illustrates the relation between overall segregation and its component dimensions, and they can be represented in a triangle only because the measurements are comparable. For simplicity we use V to denote the Vertical dimension and H to denote the Horizontal dimension, while their resultant is denoted by O for Overall segregation. As we noted earlier, there have often been references to vertical segregation, but without comparable measurements for V and O we cannot interpret the inequality measurement as a component of overall segregation.

It is important to be absolutely clear about the use of the term ‘horizontal’. We use the concept in its usual mathematical sense, where the horizontal is orthogonal to the vertical, so the dimensions are uncorrelated. However, there has been a common tendency to apply the term ‘horizontal’ to what we term ‘overall’ segregation (e.g. Crompton and Sanderson, 1990;

Cousins, 1999; EC, 2009; ETAN, 2000; Hakim, 1979, 1998; Moore, 1985; Palomba, 2002; Rubery and Fagan, 1995). Since overall segregation is made up of the vertical and horizontal components (in our sense), this conception of 'horizontal' has a vertical component, which is very odd and confusing. Also, our conventional-mathematical use of 'horizontal' must be distinguished from the practice of Charles and Grusky (2004) to apply the term 'horizontal' to the division between manual and non-manual work, because the manual/non-manual distinction is not a dimension, and is more accurately seen as a form of vertical inequality.

Being orthogonal dimensions, V and H are uncorrelated. As components of overall segregation they are negatively related for any given value of O (the greater the H, the lower the V for a particular O). However, O is not a constant and, as it varies, changes in V (or in H) necessarily affect O but not H (or not V), simply because V (and H) is a component of O. This is simply the mathematical logic. There can still be social relations, as we shall suggest, where a high value of V tends to accompany a low value of H beyond the effect of mathematical necessity. Indeed, high values of V tend to go with relatively low levels of overall segregation empirically.

Measures of Segregation

Most measures of segregation dichotomize occupations into male and female groupings, according to the tendency for men or women to dominate employment in an occupation. Such measures include the popular Index of Dissimilarity ID and the Marginal Matching measure MM. Although still one of the best measures available, and understandably popular, the Index of Dissimilarity has well-known weaknesses and has been subject to extensive criticism (Anker, 1998; Blackburn et al., 1993, 1995; Tzannatos, 1990; Watts, 1992). Therefore we prefer to use MM, which overcomes these weaknesses, with values generally similar to those of ID.

These dichotomous measures are well suited for measuring overall segregation. The two variables entailed, Gender and Gendered Occupations, are internal to the relationship and so there is no loss of information in grouping occupations as male or female. Variations in the level of segregation are seen in the extent of men employed in male-dominated occupations and women in female-dominated occupations. However, the situation is very different when we want to measure the vertical and horizontal dimensions. The introduction of inequality takes us beyond internal variables; inequalities vary from occupation to occupation so a dichotomous measure would entail a serious loss of information. We need a continuous measure across all occupations for overall segregation, and the most appropriate is the Gini coefficient (Lampard, 1994; Silber, 1989).

The Vertical Dimension

For the vertical dimension we need a measure of inequality. There are various ways of measuring inequality and each one gives a view of the nature of inequality involved in the segregation. We use two measures which together cover most of the important aspects of occupational inequality. One is money – the median pay for each occupation. Pay is the obvious economic measure of occupational inequality and is a straightforward measure to understand intuitively. The other is social stratification in terms of the general desirability

of occupations as measured by the Cambridge Social Interaction and Stratification Scale (CAMSIS).² Of the two measures, social stratification is a more complex measure to understand but refers to aspects of the occupation such as its social status and class position, and its relative position in the social hierarchy. Occupations do not merely provide economic rewards, but also are highly significant in the structuring of social space and can create or obstruct pathways to social networks and opportunities (Stewart et al., 1980). CAMSIS is a particularly good measure of social stratification, which is well related to other measures of occupational status and prestige. Unlike other measures of stratification, CAMSIS has a unique value for each country. This is both a strength and a weakness. The weakness is that it has to be established for each country so scales are available for only a limited number of countries. The strength is a better measure for each country. In the hope of creating a general measure we pooled the scales for a number of countries to create a common scale. However, when we correlated the pooled scale with the original ones we found surprisingly low correlations with little more than half the variance explained. Consequently we did not persist with the pooled scale.

In each vertical measure the need is to rank occupations rather than use precise quantities. The measure is the relation between gender and the rank of occupations, and needs to be strictly comparable to the measure of overall segregation. Therefore we use Somers' D, since the Gini is a limiting case of Somers' D (Blackburn and Jarman, 2004; Blackburn et al., 1994). That is, given the gender distribution across occupations, the maximum possible value of D occurs when occupations are ordered by their relative gender composition (from the highest to the lowest proportion of women workers, or vice versa). This is the ordering of O, and the value of D is the Gini coefficient. We thus have strictly comparable measures of overall segregation and its vertical component dimension. Both are measured by Somers' D (which is also the Gini for overall segregation). Where the inequality advantages men we give the vertical dimension a positive value, while a negative value indicates the advantage lies with women.

The Horizontal Dimension

As explained earlier, the horizontal dimension is orthogonal to the vertical dimension and so independent of it. Hence it does not entail any inequality in relation to the criterion of the vertical and only has positive values. It is defined by equality in relation to pay or CAMSIS. It represents the extent to which the overall segregation does not include the relevant aspect of inequality. It does, however, entail disadvantage to both sexes equally as it limits the freedom of occupational choice. The more an occupation is dominated by one sex, the more it is seen as inappropriate for the other sex.

We do not have a way of directly measuring H, but this does not matter as it can be easily deduced mathematically. Applying Pythagoras' theorem to Figure 1 we have $H^2 = O^2 - V^2$. This is only possible because we have directly comparable measures for O and V.

Standardization

All measures of segregation increase with the number of occupations being analysed (Anker, 1998; Jarman et al., 1999). Therefore, throughout the following discussion, the measures

Table 1. National levels of occupational gender segregation (countries sorted by marginal matching)

Nr	Country	MM	G	Nr	Country	MM	G
1	Finland	0.606	0.767	16	Brazil	0.497	0.7
2	Denmark	0.580	0.747	17	Slovakia	0.494	0.65
3	Sweden	0.571	0.709	18	Italy	0.492	0.667
4	Portugal	0.562	0.724	19	USA	0.484	0.667
5	Poland	0.558	0.728	20	South Africa	0.483	0.641
6	Spain	0.553	0.725	21	Bulgaria	0.482	0.67
7	Luxembourg	0.548	0.726	22	Mexico	0.481	0.717
8	Slovenia	0.535	0.692	23	Czech Republic	0.478	0.644
9	Germany	0.524	0.700	24	Austria	0.467	0.61
10	UK	0.514	0.677	25	Switzerland	0.465	0.623
11	South Korea	0.509	0.693	26	Japan	0.464	0.655
12	Hungary	0.505	0.690	27	Netherlands	0.458	0.633
13	Russia	0.505	0.707	28	Greece	0.456	0.647
14	Argentina	0.502	0.692	29	Ecuador	0.453	0.643
15	Belgium	0.498	0.654	30	Romania	0.436	0.636

of overall segregation and its dimensions are standardized on 200 occupations. In this way we achieve comparability between countries, regardless of the number of occupations in the national data set (Blackburn et al., 2000).³

National Levels of Overall Segregation

Table 1 presents the levels of overall segregation measured by marginal matching (MM) and the Gini coefficient (G). The data are taken from the European Social Survey combined data set for waves for 2002–2006, the International Social Survey waves 2002–2006, and Census data 2000–2001 from IPUMS.⁴ The number of occupational categories ranges from 89 (Bulgaria and Japan) to 497 (Brazil), with more than 100 for almost all countries. The greater the number of categories, the lower the potential error, and 89 is at the lower end of acceptable. With this wide range of categories, standardization of measures is essential.

The values of the two measures differ since MM is based on a division of occupations into two categories, male and female, while G takes account of the ordering of all the occupations. However, as we would expect, the Gini and MM are well related. Essentially both are measuring the same thing, and are correlated 0.86 for our sample of 30 countries. The nature of the measures leads to values of G that are consistently higher than MM but, as expected, the patterns of their variation from country to country are very similar. The sole exception is an unexpectedly high discrepancy for Mexico.

The values of MM and the Gini are significant in all countries (at $p < 0.05$). This means that there is a real and fairly substantial pattern of men and women working in different occupations. Stated differently, there is a clear tendency for women to be concentrated in ‘female’ occupations and men in ‘male’ occupations. Nevertheless, there is an appreciable range of values across countries. For the Gini the highest value, Finland, is 26 per cent greater than the lowest, Austria; and for MM the range from Finland to lowest level Romania is 39 per cent.

We see that Scandinavian countries are notable for their exceptionally high degrees of segregation. On both measures Finland has the highest segregation followed by Denmark and (at least for MM) Sweden. The two measures give slightly different orderings at the lowest levels, but the same group of countries are near the bottom, with similar levels of segregation. The countries with high segregation are *not* noted for gender inequality, nor are the low segregation countries noted for gender equality. This shows that overall segregation level is not a direct measure of inequality, and although it does have an inequality component it need not even be closely related to the degree of gender inequality.

It is important to note that in most countries inequality is not the major part of the gender segregation in the 21st century; the horizontal dimensions are fairly consistently larger than the vertical ones, especially for CAMSIS (Table 2). The only exceptions are Austria, Japan and the Czech Republic which have somewhat higher vertical dimensions on pay. In general, the extent to which the horizontal value exceeds the vertical one is quite striking. Gender segregation is much more a matter of difference than inequality.

Variations in Overall, Vertical and Horizontal Segregation

In order to understand the national variations we need to take account of the vertical and horizontal dimensions of segregation. Table 2 presents overall segregation and its vertical and horizontal dimensions, as measured by pay and CAMSIS.

Pay

Considering first the dimensions for pay, Table 2 presents data for 20 countries. As we would expect on the basis of the literature, there is a clear tendency for the vertical dimension to be positive. That means there is a general advantage to men. The one surprising exception is Slovenia, where we see a modest advantage to women. This may be due to the nature of the transition from state socialism to capitalism, where higher paying employment sectors with high male employment were impacted more negatively than those with high female employment (Orazem and Vodopivec, 1995).

Within this general situation of male advantage there are different patterns of vertical segregation and its contribution to overall segregation. With only moderate vertical dimensions and high horizontal dimensions, giving particularly high overall segregation, are the Scandinavian countries, Finland, Denmark and Sweden, together with Portugal. More clear-cut, with notably low vertical segregation along with high horizontal segregation are Mexico, Brazil and Hungary. Thus the high overall segregation of these countries is not due to gender inequality but to the pattern of men and women working in different occupations. Hence they combine egalitarianism with high overall segregation. The particularly high overall segregation of the Scandinavian countries is entirely compatible with their egalitarian reputations.

Also with low vertical segregation, but not matched by high horizontal components, so that overall segregation is low, is South Africa followed by the USA. South Africa and the USA have similar segregation patterns but are very different with regard to the development of their economies. Where South Africa and the USA are similar is in income inequality in the population, which is high, in contrast to the low gender inequality in income. Also, both arguably have an important interaction between race and gender segregation, although it may be stronger in South Africa.

Table 2. Overall, vertical and horizontal segregation according to pay and CAMSIS: countries sorted according to overall segregation (Gini)

Country	Segregation				
	Overall	Pay		CAMSIS	
	O	V	H	V	H
Finland	0.767	0.339	0.687	–	–
Denmark	0.747	0.371	0.648	–	–
Spain	0.725	0.334	0.638	–	–
Portugal	0.724	0.359	0.629	–	–
Mexico	0.717	0.011	0.716	–	–
Sweden	0.709	0.220	0.674	–0.238	0.668
Russia	0.707	0.374	0.600	–0.414	0.573
Brazil	0.704	0.110	0.696	–	–
Germany	0.700	0.420	0.560	–0.121	0.690
South Korea	0.693	0.408	0.561	–	–
Slovenia	0.692	–0.177	0.670	–0.046	0.691
Hungary	0.690	0.034	0.689	–0.190	0.664
UK	0.677	0.388	0.555	–0.015	0.677
USA	0.667	0.207	0.634	–0.178	0.643
Japan	0.655	0.519	0.399	–	–
Slovakia	0.653	–	–	–0.177	0.647
Czech Republic	0.644	0.491	0.416	–0.158	0.624
South Africa	0.641	0.120	0.630	–	–
Romania	0.636	–	–	–0.167	0.613
Netherlands	0.633	0.430	0.465	–	–
Switzerland	0.623	0.410	0.469	–0.148	0.605
Austria	0.609	0.462	0.396	0.075	0.604

At the other extreme, the pattern is quite different. Japan is striking at the other extreme, having the highest vertical segregation and the lowest horizontal segregation. It has the second lowest general (non-gendered) income inequality, and is singled out by Wilkinson and Pickett (2009) as the most egalitarian country on social problems and income (top 20% against bottom 20%), yet is the most unequal country in terms of gender and income.

Because Slovenia has a negative vertical dimension (advantage to women) the overall resultant of V and H may also be thought of as negative and therefore lower than any of the other countries, but the actual magnitude of overall segregation is not low. It may, therefore, be thought of as belonging to the group with low vertical and high overall segregation. This country represents the unfortunate case of gender equality being a result of ‘equalizing downwards’ (Standing, 1999), whereby men’s higher-paid and socially advantaged jobs were lost to recession, but women’s jobs were retained to a greater extent (Rainnie et al., 2002).

Viewing the situation across countries, it is evident that overall segregation is not so clearly related to gender inequality as has often been assumed. To understand this we need to examine the relation between vertical and overall segregation. We see that the advantage to men on pay does not follow the national differences in segregation. Indeed, there is an

inverse relation such that high overall segregation tends to have a relatively low vertical component, while the horizontal component is high. Correspondingly, high vertical segregation tends to accompany low horizontal segregation and relatively low overall segregation. For instance, Mexico has the fourth highest overall segregation with the lowest vertical and highest horizontal components while Austria has the lowest overall and horizontal segregation with the third highest vertical segregation score out of the 20 countries.

However, this pattern of relations is not entirely straightforward. There is an inevitable logical tendency for the vertical and horizontal components to vary directly with overall segregation, as together they make up the whole. For instance, the values of V and H must both be less than or equal to the value of O for each country, so that low O must have low V and H. Accordingly, mathematically we would expect a positive correlation between V and O, yet socially we find a significant negative value ($\rho = -.42, p < 0.05$). In contrast, the positive correlation between O and H is striking ($\rho = +.67$).

To control for the necessary positive tendency in the relation between O and its components, we need to consider the relative contributions of V and H. The ratio V/H reflects the relative contributions of V and H while being independent of the value of O. Therefore, we examined how the ratio V/H for pay varies with O, and got an ordering of countries very similar to that for V. The correlation is slightly more negative ($\rho = -.45$), confirming a clear tendency for inequality favouring men to be less where segregation is greater. For instance, Japan has one of the lowest overall segregation levels yet the highest V/H ratio, while Sweden's relatively high overall segregation entails a rather low vertical element and ratio. Across the 20 countries there is a strong negative correlation ($\rho = -.91$) between the vertical and horizontal dimensions, while, as we have seen, there is a clear negative relation between V and O. Quite simply, these data show that the more egalitarian a society is in terms of gender and pay in employment, the higher is the overall segregation. Or viewing it differently, the greater the occupational gender segregation, the lower the disadvantage to women in terms of pay.⁵

CAMSIS

We have values of CAMSIS, based on the detailed set of occupations for 12 countries. In contrast to the general finding on pay, we find that the vertical measure based on CAMSIS is almost exclusively negative, indicating women have the more attractive occupations. Only Austria shows an advantage to men. This general pattern is consistent with previous findings for the USA, Canada and Britain.⁶ The current findings indicating an advantage to women in terms of the social attractiveness of occupations make clear that this is a fairly general situation. (Social attractiveness also includes working in better physical conditions and so being safer.) As stratification and income are positively related ($r = 0.7$ in Britain), the gendered contrast is quite striking.

The general lack of publicity of this advantage to women is surprising. There was not always this advantage to women; it is part of a significant change in industrialized societies in the last 50 years. The change results from changes in the occupational structure. Formerly there were fewer adult women in employment, and the women were more likely than men to be in manual occupations. As women's labour market participation has increased, manual work has declined while non-manual work expanded, and it is predominantly women who have moved into non-manual jobs. Consequently, it is now men

who are more likely than women to be manual workers. Initially, in the change from manual to non-manual work, women tended to be employed in lower level non-manual occupations, especially clerical work. More recently, however, they have contributed to the considerable expansion of professional employment. While there may be some element of individual preference in the decision to pursue a manual rather than a non-manual occupation, and there may be aspects where manual work has positive attributes as against non-manual work, this is hardly the dominant situation. There is a substantial literature associating manual work with higher levels of exposure to toxic substances, higher levels of injury and death, and less pleasant working conditions which in turn affect social status as measured through stratification measures (e.g. Case and Deaton, 2005). Although this development can be expressed in terms of changing labour markets and social processes (Blackburn et al., 2002), it has also been influenced by the political, legal and ideological efforts to reduce inequalities between women and men.

Russia has by far the highest negative vertical component and the second highest overall segregation, despite having the lowest horizontal component.⁷ Sweden has the second highest negative V and the highest O. At the other extreme Austria is again an extreme case, with the lowest overall segregation while being the only country with a positive vertical component. Contrary to this trend, Germany and Slovenia are ninth and tenth on CAMSIS yet only third and fourth on overall segregation. Nevertheless, the general trend is clear: high overall segregation tends to accompany high negative vertical segregation.

To measure the trend precisely, we again correlate V and V/H with O. Here we find no difference in the two correlations; V is just as strongly related to O as is V/H. This indicates that the mathematically expected tendency for V to be directly (positively) influenced by variations in O is negligible. Again we find a significant negative correlation, indicating the advantage to women increases with overall segregation ($\rho = -.48$).

Although we are now dealing with a tendency for advantage to be with women, the essential pattern is the same. Higher overall segregation tends to reduce male advantage and improve the position of women. The greater the degree of overall segregation, the less the possibility exists for discrimination against women and so there is more scope for women to develop progressive careers. For instance, within nursing, men disproportionately fill the senior positions (Williams, 1989) but the fewer the number of male nurses, the more senior positions must be filled by women.

Conclusion

This is the first time that segregation patterns, involving the vertical and horizontal dimensions and the resultant overall segregation, have been examined over a range of countries. We find appreciable national variation, and see clearly the importance of taking account of the dimensions of segregation. There is a considerable degree of overall gender segregation in all industrial countries. Even so, there is a wide range from the Nordic countries at the top to the relatively low segregation countries like Romania and Austria. However, the importance of the segregation levels cannot be understood without attention to the dimensions of inequality and difference.

Having examined the vertical and horizontal dimensions of segregation, we now can see clearly the mistake of regarding overall segregation as a measure or even an indicator of gender inequality disadvantaging women. On the other hand, it is the existence of

segregation which creates the opportunity for gender inequality across occupations. The actual extent of inequality cannot be deduced from the level of gender segregation without an investigation of the vertical dimension. In fact, gender inequality, particularly in terms of pay, is large enough to have a serious influence on workers' lives. The horizontal component (difference with equality) is generally much larger than the vertical (inequality) dimension. Although not entailing inequality, the horizontal segregation does tend to restrict occupational choice for both women and men.

Perhaps our most important finding is that, at least for these industrially developed countries, overall segregation and the vertical dimension are inversely related. The higher the overall segregation, the lower the advantage to men or, for CAMSIS, the higher the advantage to women. This is directly contrary to popular assumptions. It is, however, consistent with the continuing existence of discrimination against women, so that the less they are in competition with men (higher overall segregation) the greater their attainment of senior positions (low vertical segregation).

Although the gender inequalities may not generally be the major part of occupational segregation, they are nevertheless substantial and important. As expected, in terms of pay men are advantaged everywhere, with the sole exception of Slovenia. In contrast to the prevailing expectations, but consistent with the few previous studies, generally based on single country data (e.g. Blackburn et al., 2001; Brooks et al., 2003; England, 1979; Fox and Suschnigg, 1989), we found that in all countries for which the data are available, apart from Austria, women tend to occupy higher positions in the hierarchy of social stratification than do men. The vertical component on pay is larger than that on CAMSIS, indicating greater disadvantage to women. However, the negative values on CAMSIS indicate that the current situation also entails disadvantage to men.

This finding refers to the general position of women and men, taken as whole groups in the entire labour market. In this analysis we are not focusing on the situation at the very top of the occupational strata so we cannot shed light on the 'vertical ceiling' effect. It would indeed be fascinating to know whether the general improvement in women's position in the occupational sphere also extends to the very top boardrooms, Cabinet offices and elite professional positions but this would require a much more finely focused study.

Occupational gender segregation may entail fewer inequalities than generally supposed, but the negative effects of segregation remain substantial and important. Whatever the relative sizes of the vertical and horizontal dimensions, both entail real disadvantages.

What is most important about these findings is that they show that the implications of the feminization of an occupation are complicated. This is partly due to changes in the status of women in society (the legal and social status of women varies across societies even today), and partly due to changes in the nature of work which in turn have had consequences for men and women. These changes have had an important effect on family life, as work has actually become quite pleasant for many and actually desirable for more reasons than just money. Given widespread changes in women's education and training levels, improvements in their legal status, and the reduction of barriers for horizontal and vertical movement, much greater attention to a greater range of possible outcomes, positive and negative, needs to be paid when assessing the consequences of the feminization or masculinization of occupations. One can no longer simply read off an interpretation of 'inequality' from the fact of a segregated labour market – we would argue that probably

one never could. Rather, this interpretation needs to be empirically explored and documented, and its intertwining with the system of social class stratification (and ethnic segregation, if possible) needs to be assessed. This article shows that men remain on the top in terms of pay, but women, when taken as a whole group in comparison to men as a whole group, are on the top in terms of stratification with all of the ensuing social ramifications that such a shift in social space entails. This means that women's occupations are healthier, permit greater access to higher status networks, and involve working with better educated people than men's occupations.

Appendix

Sources of data and available country data for each indicator

Country	Source ¹	Occ. cat. ²	Pay	CAMSIS
Argentina	C	167		
Austria	E	102	X	X
Belgium	E	108		X
Brazil	C	494	X	
Bulgaria	I	89		
Czech Republic	E	103	X	X
Denmark	E	103	X	X
Ecuador	C	114		
Finland	E	100	X	
Germany	E	105	X	X
Greece	E	103		
Hungary	E	106	X	X
Italy	E	102		
Japan	I	89	X	
Luxembourg	E	98		X
Mexico	C	457	X	
Netherlands	E	104	X	
Poland	E	104		X
Portugal	E	106	X	X
Romania	E	371		X
Russia		109	X	X
Slovakia	E	107		X
Slovenia	E	99	X	X
South Africa	C	135	X	
South Korea	I	110	X	
Spain	E	106	X	
Sweden	E	104	X	X
Switzerland	E	105	X	X
UK	E	105	X	X
USA	C	470	X	X

Notes:

¹Sources: E = European Social Survey combined data set, waves 2002–2006; I = International Social Survey combined data set, waves 2002–2006; C = Census data from IPUMS, 2000–2001.

²Number of occupational categories used to construct occupational segregation measures.

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Notes

- 1 EC (2009) adopts our approach when considering vertical and horizontal dimensions of segregation, and applies it to 22 countries for a vertical dimension of pay. However, the measure of pay is *not* a measure of gender inequality, but a rough indicator of the occupational ordering by the level of male pay. Also it uses only 26 occupational categories, which is too few for satisfactory measurement (as explained later in the article).
- 2 CAMSIS scores are available at <http://www.camsis.stir.ac.uk>, together with references to articles on its construction and use (e.g. Blackburn and Jarman, 2006; Prandy and Jones, 2001) and we acknowledge the cooperation of Paul Lambert. CAMSIS may be thought of as a measure of occupational status or class. For a discussion of its original construction see Stewart et al., 1980.
- 3 The standardization formula for the Marginal Matching measure is:

$MM_{200i} = MM_{200E} \times MM_{ni} / MM_{nE}$, where n is the number of occupational categories, i represents the country and E indicates the expected value. Thus, MM_{ni} represents the observed value in country i . MM_{nE} is the expected value for n occupations, estimated according to the formula

$MM_{nE} = 1 - 1/[1 + 0.6(\log_{10} n)^{0.93}]$. MM_{200E} is a constant value of MM_{nE} standardized on 200 occupations ($MM_{200E} = 0.56567$)

Gini is standardized according to the formula $G_{200i} = G_{200E} \times G_{ni} / G_{nE}$, where

$G_{nE} = 1 - 1/[1 + 1.7(\log_{10} n)^{0.93}]$, with n , i and E defined as for MM , and G_{200E} is the value of G_{nE} estimated for 200 occupations ($G_{nE} = 0.78678$)

With corresponding notation the standardization formulae for the measures of vertical and horizontal segregation are respectively $V_{200i} = V_{ni} \times G_{200E} / G_{nE}$ and $H_{200i} = H_{ni} \times G_{200E} / G_{nE}$

Any national variation in data quality is beyond our control, but standardization makes the countries as comparable as possible.

- 4 See Appendix 1 for details of the subsamples with different types of data for this and Table 2.
- 5 When O is zero, V must also be zero. Although there is insufficient data to establish a clear trend, it suggests that initially the value of V must increase with O , then as O increases further (in the range observed here) the value of V declines. V rises and falls like part of a sine curve. Then there are national variations.
- 6 Fox and Suschnigg (1989) and England (1979) dismiss the results for Canada and the USA on the grounds that the prestige scales they used were not satisfactory. However, Blackburn and Jarman (2005), using the more satisfactory (but strongly related) CAMSIS, found clearly negative results for the USA and Britain.
- 7 Mathematical convention would make O negative when V is negative. However, for ease of presentation and consistent comparison when considering pay and CAMSIS, we keep O positive.

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