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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. Explanations for the national variations have ranged from those which typologise countries as having different types of gender regime that affect labour market outcomes (Rubery and Fagan, 1995; Chang, 2000), the impact of national policies (Chang, 2000; Charles and Grusky, 2004), the role of motherhood (England, 2005), differential levels of the distribution of human capital by gender in a given society, the social construction of skill (Esterez-Abe, 2006), the structural characteristics of modern economies with large service sectors (Charles, 2000), and fertility rates (Charles, 2000). There have been a number of important studies exploring cross-national differences in segregation levels (Anker, 1998; Tomaskovic-Devey, 2006, Rubery and Fagan, 1995; Charles and Grusky, 2004). 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.

Segregation may be seen as having two component *dimensions*, a vertical dimension measuring inequality and an orthogonal horizontal dimension measuring difference without inequality. 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 essential point is that the two dimensions together constitute the overall segregation, and so must be measured in strictly comparable ways. The conceptualisation of segregation has rarely included a consideration of the *dimensions*. Yet an adequate understanding of the nature and significance of segregation requires the measurement of its component dimensions.

This paper provides a rigorous measurement of the differences in cross-national occupational gender segregation and explores the reasons for these differences. Besides measuring variations in overall segregation, we explore the patterns of its vertical and horizontal dimensions. While some of the countries we include in the present analysis have been discussed before, only two, UK and USA, (Blackburn and Jarman, 2006) have been examined in terms of the vertical and horizontal dimensions of segregation. We also take advantage of the availability of new and high-quality data, based on detailed classifications of occupations, to include countries that have previously not been analyzed. The data enable us to provide a more thorough understanding of the variations in segregation in relation to social, economic and cultural factors.²

All measures of segregation increase with the number of occupations being analysed. Therefore, throughout the discussion, the measures of overall segregation and its dimensions

¹ This paper is based on research in ESRC-funded project RES-000-22-2779.

² See Appendix for the sources of data.

are standardised on 200 occupations. In this way we achieve comparability between countries, regardless of the number of occupations in the national data set (Blackburn, Jarman and Brooks, 2000).³

Table 1. National Levels of Occupational Gender Segregation (Countries sorted by Marginal Matching)

Nr.	Country	MM	G	Nr.	Country	MM	G
1	Finland	.61	.77	16	Brazil	.50	.70
2	Denmark	.58	.75	17	Slovakia	.49	.65
3	Sweden	.57	.71	18	Italy	.49	.67
4	Portugal	.56	.72	19	USA	.48	.67
5	Poland	.56	.73	20	South Africa	.48	.64
6	Spain	.55	.73	21	Bulgaria	.48	.67
7	Luxembourg	.55	.73	22	Mexico	.48	.72
8	Slovenia	.54	.69	23	Czech Republic	.48	.64
9	Germany	.52	.70	24	Austria	.47	.61
10	UK	.51	.68	25	Switzerland	.47	.62
11	South Korea	.51	.69	26	Japan	.46	.66
12	Hungary	.51	.69	27	Netherlands	.46	.63
13	Russia	.51	.71	28	Greece	.46	.65
14	Argentina	.50	.69	29	Ecuador	.45	.64
15	Belgium	.50	.65	30	Romania	.44	.64

Table 1⁴ presents the levels of overall segregation measured by marginal matching (MM) and the Gini coefficient (G). MM, like all other popular measures of segregation, including the Index of Dissimilarity (ID), is based on a division of occupations into two categories, male and female, according to the tendency for men or women to dominate employment in an occupation. On the other hand, G takes account of the ordering of all the occupations. The nature of the measure leads to values of G that are consistently higher than MM but, as we would expect, the patterns of their variation 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 $p < .05$). This means that there is a real and fairly substantial pattern of men and women working in different occupations. There is a definite tendency for women to be concentrated in ‘female’

³ The standardisation formula for the Marginal Matching measure is:

$MM_{200} = MM_{200E} \times MM_{ni}/MM_{nE}$, where n is the number of occupational categories and i represents the country. 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} standardised on 200 occupations ($MM_{200E} = 0.56567$).

Gini is standardised 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 standardisation formulae for the measures of vertical and horizontal segregation are respectively $V_{200i} = V_{ni} \times G_{200E}/G_{nE}$ and $H_{200i} = H_{ni} \times G_{200E}/G_{nE}$.

⁴ See Appendix 1 for details of the subsamples with different types of data for this and subsequent tables.

occupations and men in ‘male’ occupations.

We see that Finland is notable for its exceptionally high degree of segregation followed by Scandinavian neighbours Denmark and (at least for MM) Sweden. At the other extreme are Romania (MM) and Austria (Gini). The two measures give slightly different orderings at the lowest levels, but they are the same countries. The countries with high segregation are *not* noted for gender inequality, nor are the low segregation countries noted for gender equality. This should not surprise us as, contrary to some popular assumptions in the past (eg e.g. Blau and Hendricks, 1979; Bradley, 1989; Reskin and Roos, 1990, Boyd et al 1991; Buchmann and Charles, 1992; Yamagata et al. 1997; Walby, 1997; Weedon, 1998), segregation is not a measure of inequality, nor need it be closely related to the degree of gender inequality.

In order to understand the national variations we need to take account of the vertical and horizontal dimensions of segregation. As noted above, the vertical dimension, and only the vertical dimension, measures inequality, while the horizontal dimension measures the extent of difference without inequality. This is the usual and mathematical use of the term ‘horizontal’, as being orthogonal to the vertical. It must be clearly distinguished from the common tendency to apply the term to overall segregation (thus including a vertical element in the ‘horizontal’). Also it must be distinguished from the practice of Charles and Grusky (2004) to apply the term to the distinction between manual and non-manual work, because this basic distinction is not a dimension, though it entails vertical inequality.

If we were to use a dichotomous measure such as Marginal Matching or any of the popular alternatives, a comparable vertical measure would have to be a dichotomy, with a serious loss of information. Accordingly, in order to take account of the variations on the vertical dimension, overall segregation is measured by the gini. The following discussion uses the gini for overall segregation, though it will sometimes be useful to note the strength of MM.

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, though sometimes it is useful to use G to indicate the Gini measure.

Figure 1. The Dimensions of Segregation

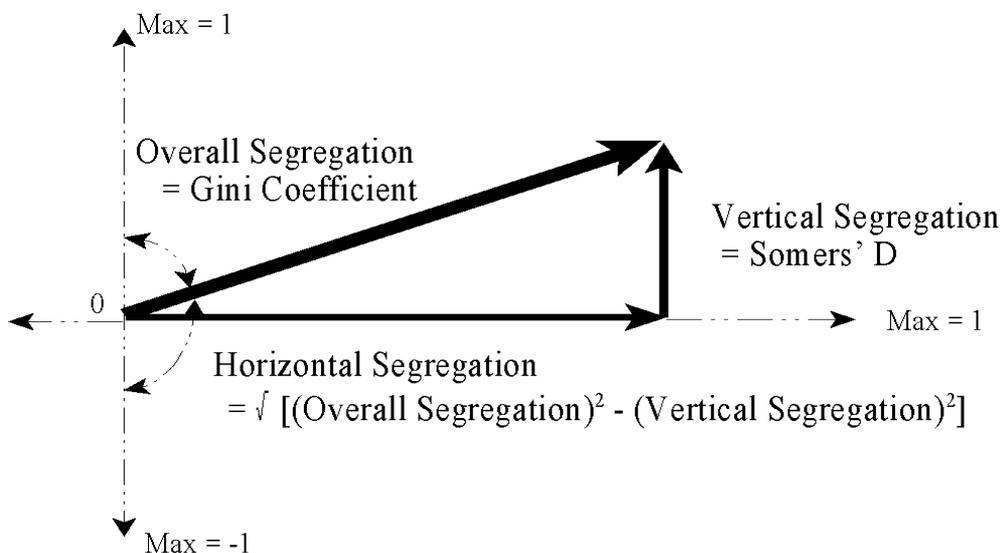


Figure 1 illustrates that V and H are dimensions of segregation. Often there have been references to vertical segregation, but without comparable measurement for V and O we cannot interpret the inequality measurement as a component of overall segregation. Also, we can only deduce the horizontal component mathematically ($H^2 = O^2 - V^2$), and this is only possible if we have directly comparable measures for O and V. For this purpose we use Somers' D which has a maximum value for O. 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 measure of O is the Gini coefficient (Blackburn et al., 1994; 2004). So we have strictly comparable measures of overall segregation and its component dimensions.

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. The other is social stratification in terms of the general desirability of occupations as measured by the Cambridge Social Interaction and Stratification Scale (CAMSIS)⁵. In each case the need is to rank occupations rather than use precise quantities. Where the inequality advantages men we give the dimension a positive value, while a negative value indicates the advantage lies with women. Table 2 presents overall segregation and its vertical and horizontal dimensions, as measured by pay and CAMSIS.

Pay

As we would expect on the basis of the literature, there is a clear tendency for the vertical dimension on pay 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 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 they are similar is in income inequality which is

⁵ CAMSIS scores are available at www.camsis.stir.ac.uk and we acknowledge the cooperation of Paul Lambert. CAMSIS may be thought of as a measure of occupational status or class.

high, in contrast to the low gender inequality. Also, both arguably have an important interaction between race and gender segregation, although it may be stronger in South Africa.

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 (Rannie, Smith and Swain, 2002).

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	.77	.34	.69	–	–
Denmark	.75	.37	.65	–	–
Spain	.73	.33	.64	–	–
Portugal	.72	.36	.63	–	–
Mexico	.72	.01	.72	–	–
Sweden	.71	.22	.67	–.24	.67
Russia	.71	.37	.60	–.41	.57
Brazil	.70	.11	.70	–	–
Germany	.70	.42	.56	–.12	.69
South Korea	.69	.41	.56	–	–
Slovenia	.69	–.18	.67	–.05	.69
Hungary	.69	.03	.69	–.19	.66
UK	.68	.39	.56	–.02	.68
USA	.67	.21	.63	–.18	.64
Japan	.66	.52	.40	–	–
Slovakia	.65	–	–	–.18	.65
Czech Republic	.64	.49	.42	–.16	.62
South Africa	.64	.12	.63	–	–
Romania	.64	–	–	–.17	.61
Netherlands	.63	.43	.47	–	–
Switzerland	.62	.41	.47	–.15	.61
Austria	.61	.46	.40	.08	.60

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 US, Canada and Britain, though the result has been downplayed and largely ignored.⁶ The current findings indicating an advantage to women in terms of the attractiveness of occupations make clear that this is a fairly general situation. As stratification and income are positively related, 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 industrialised societies in the last fifty years. The change results from changes in the occupational structure. Formerly women were more likely than men to be in manual occupations, but as manual work has declined it is predominantly women who have moved into non-manual jobs, so that now it is 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 low level non-manual occupations, especially clerical work. More recently, however, they have contributed to the expansion of professional employment. Although this development can be expressed in terms of changing labour markets and social processes (Blackburn et al., 2002) it has probably, in part, also been influenced by the political and ideological efforts to reduce inequalities between women and men.

The Horizontal Dimension

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. It is important to note that the horizontal dimensions are fairly consistently larger than the vertical ones, especially for CAMSIS. 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.

Overall Segregation and the Vertical dimensions

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. Considering first the vertical dimension of *pay*, we note the advantage to men 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 twenty countries. However, this pattern of relations is not entirely straight-forward. There is an inevitable tendency for the vertical and horizontal components

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.

to vary directly with overall segregation, as together they make up the whole. For instance, the values of V and H must be less than or equal to the value of O for each country so that low O must have low V and H. Accordingly we would expect a positive correlation between V and O, yet we find a significant negative value ($\rho = -.42, p < .05$). In contrast, the positive correlation between O and H is striking ($\rho = +.67$).⁷

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 twenty 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, the more egalitarian a society is in terms of gender and pay in employment, the higher the is overall segregation.

Turning to the vertical dimension measured by CAMSIS, we again correlate V and V/H with O. Here we find no difference in the two correlations, indicating a negligible tendency for V to be directly (positively) influenced by variations in O. Again we find a significant correlation indicating the advantage to women increases with overall segregation ($\rho = -.48$). Austria is again an extreme case, with its low overall segregation while being the only instance of having a positive vertical component. 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. We express the relation causally as this appears to be the situation. 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.

We now can see clearly the mistake of regarding overall segregation as a measure or even an indicator of gender inequality disadvantaging women. Firstly the horizontal component (difference with equality) is generally much larger than the vertical (inequality) dimension. Furthermore, there is a negative relation between O and V - the higher the overall segregation, the lower the advantage to men or, for CAMSIS, the higher the advantage to women. This is not to say there are no inequalities, and as the vertical component on pay is larger than that on CAMSIS, there is still appreciable disadvantage to women. However, the negative values on CAMSIS indicate that the current situation also entails disadvantage to men.

Explaining National Variations in Segregation

To understand the national variations in segregation we need to consider the influences on

⁷ In general we follow the usual convention where relations are defined as significant when $p < 0.05$. However, because of the small numbers of cases in the present exploratory analysis we cautiously accept relations where $p < 0.1$.

overall segregation and its vertical and horizontal components. When examining the two dimensions, the relevant measure of overall segregation is the gini coefficient. Relations with relevant influencing variables are stronger with MM than with the gini coefficient, as Table 3 illustrates. This is unsurprising as MM simply divides occupations into ‘female’ and ‘male’ categories, according to the proportions of women and men in occupations. Other dichotomous measures, such as the Index of Dissimilarity (ID), would show similar results. The Gini coefficient is different, however, in that it measures the gendering of occupations over many occupations⁸. The value of the Gini depends in part on the pattern of distribution of men and women across occupations *within* the female and male categories (as defined in MM), while more extreme gender distributions in some occupations have a disproportionate influence (Blackburn et al, 1994).). However, the Gini is well related to MM and provides a useful measure. Essentially both are measuring the same thing, and are correlated .86 for our sample of 30 countries, or .91 for the richer industrial countries with GDP per capita above 20,000 US\$.

Many societal characteristics are related to the level of overall segregation. In the present data most of the characteristics are significantly related to MM but not to the gini, though a larger sample would be expected to give significant relations with the gini also. In Table 3 we use both measures to illustrate some clear relations with overall segregation. Subsequently our interest lies with its two component dimensions and so with the corresponding gini measures of overall segregation. Relations with MM are explored elsewhere, in Racko et al (2009).

Table 3 presents the Gini and MM for a number of related societal characteristics related to overall segregation. They are presented for the whole sample of 30 countries (just 22 for values) and for a sub-sample of rich industrial countries. Limitations of data for the vertical measures means that further analysis will be for restricted samples. Here we may note a clear tendency for stronger relations among the richer countries. The one exception is Investment in Technology, as we would expect. The richer countries all tend to have similar levels of high investment, while the other countries tend to have lower investment. The basic trend is for segregation to increase with investment in technology.

Table 3. Overall Segregation (MM and Gini) related to socioeconomic and cultural indicators for all available countries and for rich countries only

Indicator	All Available Countries		Rich Countries Only	
	MM	G	MM	G
Investment in Technology	.40**	.21	.30	.31*
Protestant Countries	.37**	.21	.48**	.44**
Female Economic Activity Rate (as percentage of male rate)	.34**	.16	.46**	.28
N	30		19	
Egalitarianism Values	.48**	.34*	.52**	.45**
Mastery Values	-.41**	-.34*	-.42**	-.46**
N	22		16	

** p < .05, * p < .1 (Spearman rho, one-tailed).

Particularly striking is the relation with the economic activity rate for women. It might be expected that segregation would be lower in countries where there are high level of women’s

⁸ MM and ID are instances of the Gini coefficient when there are only two occupational categories.

participation in the labour market. In fact the reverse is clearly the case. Protestant countries⁹ are distinctive in their degree of segregation. Also investment in technological research and development is higher in protestant countries ($\rho = .41, p = .01$). This is in keeping with Weber's conceptualisation of the protestant ethic, and suggests that the protestant work ethic is associated with gender segregation.

The values of egalitarianism and mastery also show clear relations to segregation, and are discussed below in connection with the dimensions of segregation. Here we may note that egalitarianism does not accompany low segregation but just the opposite. Again it is the vertical dimension of pay which is negligible.

When we examine the two dimensions of segregation we find that there are important significant relations, particularly for V. There are similar relations with V/H, but in view of the consistent close relation with V we do not report them. The strength of the relations of variables to the vertical and/or horizontal dimensions does not necessarily correspond to the strength of relation with overall segregation. As we consider relevant factors bearing on segregation we shall also see whether it is overall segregation or its component of inequality or difference which is important.

National Economic differences

We consider four measures which can broadly be described as economic. Firstly we examine the GDP per capita, which can be regarded as an indicator of national affluence, but not of the inequality of distribution within countries. Inequality in income distribution is measured with a gini coefficient, as commonly used in economics. The United Nations Human Development Index (HDI) is a familiar measure combining economic development with education and living standards. Also, since the level of technological development has direct consequences for the nation's economic performance, we look at the Investment in Technology measure. This is a composite measure of two UN indicators: (a) proportion of GDP expenditures channelled towards research and development and (b) proportion of people in a society who are employed in research and development.

Table 4. Economic Measures by Overall, Vertical and Horizontal Segregation

Indicator	Pay			CAMSIS		
	O	V	H	O	V	H
GDP per capita	-.27	.41**	-.41**	-.20	.40*	.09
Investment in Technology	.23	.42**	-.25	.24	.03	.07
Income Inequality	-.06	-.40**	-.19	-.17	.10	-.36
Human Development Index	-.09	.41**	-.30*	-.09	.29	.18
N		20			12	

** $p < .05$, * $p < .1$ (Spearman rho, one-tailed).

The measures of overall segregation are similar but different for the 20 and 12 sets of occupations, and not statistically significant, reflecting the problem of small numbers of countries. This is partly because more countries are included, 20 against 12, but not entirely so. The relationships of the vertical and horizontal measures with pay are larger than the relationships with CAMSIS. All the variables are significantly related to the vertical dimensions of pay, as are GDP and HDI with the horizontal dimension. For CAMSIS the

⁹ Protestants constitute more than half of a country's population.

only significant relation is between the vertical dimension and GDP.

The pattern for income distribution is somewhat surprising. High income inequality among all workers, regardless of sex, accompanies less inequality between women and men; women share in the high pay. On the other hand, countries that are relatively egalitarian in terms of the incomes from different occupations are inegalitarian in terms of gender. GDP, HDI and Technology all have the opposite effect, having positive relationships with the vertical dimension. The greater the economic and technical development, the more men have the better paying occupations. Correspondingly, the horizontal dimension is negatively related to these variables, particularly to GDP (though not significantly with technology), indicating a decline in equality with economic advance. However, closer inspection reveals a rather different picture. The five countries with the lowest vertical dimension – the lowest inequality on pay - include four of the five with the lowest levels of GDP, HDI and investment in technology, that is Hungary, South Africa, Mexico and Brazil. Their levels of GDP in particular are very substantially below the levels for the other fifteen countries. The remaining country in the bottom five on the vertical dimension is Slovenia, which also is well below average on all the three measures. These five countries have a major influence on the positive correlation. Yet within the five and within the remaining 15 the correlations are actually negative, but not significant. It seems the basic contrast is between the more industrialised, high GDP group of countries and less industrialised lower GDP countries, with income inequality favouring men more in the richer, more industrially developed countries.

Turning to location in the society's general pattern of social stratification, as measured by CAMSIS, the relations are less clear. As with pay, there is a positive relation with GDP, indicating that in the more prosperous countries men tend to have more attractive jobs. None of the other correlations are large enough to be significant with so few cases, but the HDI relation with V could well be consistent with that for pay. It also appears plausible that the more equal a society is in terms of income, the more equal men and women are in terms of status, as the correlation of income with horizontal segregation is relatively large.

Gender Related Measures

The Gender Empowerment measure (GEM) is a United Nations measure of women's empowerment, designed to measure the extent of women's success in gaining high level occupations. In all countries the measure is less than one, where one would indicate equality with men and being less than one indicates a tendency for men to dominate senior positions. In the more industrially developed countries the index is quite close to unity, while in some of the poor nations it is quite low. The Gender related Development Index (GDI) is another UN measure of women's opportunities. It reflects women's life expectancies, literacy and formal education levels and earned income in relation to men. It is a gender specific version of the Human Development Index, (HDI), so that it also tends to vary with the HDI (having a maximum equal to the HDI). We use these measures to explore how women's labour market success relates to segregation levels.

Blackburn et al (2000) found both measures strongly related to MM for a sample of 16 industrial countries, though when 12 less industrialised countries were also included only the GEM was significantly related. The interesting point was that the relations were positive, showing that women's success in the labour market – their empowerment - was associated with greater segregation, contrary to general expectations. In the present samples, when all countries are included, or just the 20 with data on pay, MM is again related to the GEM

(.39** and .42**). When we consider the 18 richer, more industrialised countries the relation with GEM is stronger, as expected, so that the Gini is also significantly related (MM .48**, Gini .35*). However, in each case the relation with the GDI is not significant. For the 12 industrial countries with CAMSIS data neither the GEM nor the GDI is strongly related is strongly related.

Since the GEM and GDI are meant to measure much the same thing, our present finding is surprising. What is consistent with the earlier findings is that all the correlations with MM and the Gini are positive (or almost zero). This means that, contrary to popular assumptions, the higher the segregation, the lower the gender inequality. This is, of course, another way of observing the pattern we have already noted.

Table 5. Gender Related Measures by Overall, Vertical and Horizontal dimensions

Indicator	Pay			CAMSIS		
	O	V	H	O	V	H
Gender Development Index	.03	.33*	-.21	-.01	.32	.28
N		20			12	
Gender Empowerment Measure	.21	.10	-.04	.06	.35	.34
N		19			12	

** p < .05, * p < .1 (Spearman rho, one-tailed).

When we consider the vertical and horizontal components the results are mainly but not entirely as expected. Since GEM is a measure of approach to gender equality, we would expect a limited relation with pay; the closer GEM approaches equality, the less the vertical advantage to men. Because high overall segregation tends to accompany low vertical segregation, this reinforces our expectation of a low relation with the vertical dimension. In fact we find the relation is fairly negligible, roughly in keeping with expectation, though we might have expected a negative correlation. As there appears to be no relation between the GDI and O it is only mildly surprising that there appears to a positive relation between the GDI and the vertical dimension and a negative one with the horizontal dimension. These relations are weaker than those for the HDI, suggesting that the gender element of the GDI does have the expected effect.

Turning to our 12 countries with CAMSIS measures, there appear to be weak positive relations with the vertical and horizontal dimensions for both the GEM and GDI. It may seem surprising that the advantage to women declines as the GEM and GDI increase. On the other hand, as GEM and GDI approach equality we would expect V to move towards zero, which here means increasing. Such a change could also effect an increase in H. A difficulty in interpreting the results is that the GEM and GDI only tap gender inequalities at the higher levels of the occupational structure, and it is unclear how changes at these levels relate to changes throughout the structure. This could have relevance for pay as well as CAMSIS.

Religion

Since the classic argument of Weber, linking Protestantism to industrial development and capitalism, there has been interest in the economic relevance of religion. In the present analysis we explore the interaction between occupational gender segregation and two forms of Christianity which are distinctively dominant in some countries: Protestant and Catholic¹⁰.

¹⁰ Protestants and Catholics respectively constitute more than half of a country's population.

Catholic countries are not distinctive in terms of overall segregation. However, they are clearly distinguished on the vertical and horizontal dimensions for income. The correlation with vertical component is negative and the horizontal component is positive. This indicates that in Catholic countries women are less disadvantaged, or even advantaged, in terms of pay, and more likely to be in different but equal occupations. On the other hand, if the weak relation with CAMSIS can be trusted, men tend to dominate the higher status occupations.

Table 6. Religion by Overall, Vertical and Horizontal dimensions

Indicator	Pay			CAMSIS		
	O	V	H	O	V	H
Protestant countries	.19	-.23	.25	.31	-.14	.31
Catholic countries	.19	-.50**	.41**	-.15	.21	.15
Neither Protestant nor Catholic	-.37**	.72**	-.65**	-.12	-.07	-.42*
N		20			12	

** p < .05, * p < .1 (Spearman rho, one-tailed).

We saw above (table 3) that overall segregation tends to be high in Protestant countries, and especially the richer ones. However, in these more limited samples the Gini coefficient is lower and not significant, though MM (.42) is still significant for the 20 countries. In catholic countries, women are less disadvantaged on pay and are largely in different but equally paid occupations. The Protestant countries appear to have a similar but less marked pattern for the 20 countries. This is reinforced by the contrasting results for the countries that are neither predominantly Catholic nor Protestant, where low overall segregation accompanies strikingly high advantage to men and low horizontal segregation.

Cultural Values

We also related the dimensions of segregation with cultural values (Schwartz, 1999, 2003) and a measure of *laissez-faire* capitalist values. Values were available for 22 of our 30 countries (only 15 for *laissez-faire* capitalist values), though inevitably less with measures of the dimensions of segregation. We find some striking results, including significant absence of relationship with some aspects of segregation alongside significant relationships with other aspects of segregation. The contrasts are between overall and vertical measures.

Egalitarianism

This is a concern with equal treatment of people or equal opportunities together with social responsibility and caring for others. For the 22 countries there is a clear positive relation with overall segregation with both the Gini (rho = .34, p = .06) and MM (rho = .48, p = .01), though significance declines for the smaller sub-samples with pay and CAMSIS data. In keeping with egalitarian values there is effectively no vertical segregation. The CAMSIS result is positive, indicating a decline in women's advantage, but it is far from significant, while for pay there is a significant approach to zero (rho = .002, p < .01, measured for closeness to zero). Egalitarian values apply to gender equality. It is no surprise to find the Scandinavian countries scoring particularly highly on egalitarianism while contributing to the level of overall segregation. At the other extreme, against the trend is Switzerland, with a high score on egalitarian values but low overall segregation. The general pattern on egalitarian values is in keeping with our initial finding of a negative relation between overall and vertical segregation.

Intellectual Autonomy

This is concerned with being creative, freedom of thought and being able to make decisions. For the full sample of 22 countries for which we have data on values, overall segregation is correlated .01, which is significantly close to zero. For our smaller samples in table 7 the negative correlations are not significant, and such autonomy, it appears, has little connection with gender. Yet there is a clear relationship with inequality in terms of CAMSIS, which is significant though covering only 11 countries. The higher the stratification position of women in a country, the lower the concern with intellectual autonomy. It appears likely that the same applies to pay, in that the closer women come to having pay equality, the less the concern with autonomy. Low concern is found in countries of Eastern Europe together with Sweden. The result for CAMSIS is essentially a contrast between East and West Europe, with less concern for autonomy in the East. It is possible that the other countries of our set - mostly non-European - would present a different picture if CAMSIS data were available.

Table 7. Values by Overall, Vertical and Horizontal Segregation

Value indicator	Overall			CAMSIS		
	O	V	H	O	V	H
<i>Cultural Values</i>						
Egalitarianism	.31	.00	.12	.06	.23	.24
Intellectual Autonomy	-.18	.31	-.21	-.07	.53**	.25
Mastery	-.39*	.02	-.17	-.12	-.02	-.33
Material Wealth	.09	.14	-.02	-.06	-.51*	-.54**
Conservatism	.20	-.12	.07	-.03	-.36	-.18
<i>Laissez-Faire Capitalist Values</i>						
N	-.48**	.64**	-.50**	NA	NA	NA
		14			11	

** p < .05, * p < .1 (Spearman rho, one-tailed).

Mastery

Mastery values refer to an emphasis on being successful and being recognised and admired for achievements. Here we find a negative relation with overall segregation, at least for the 14 and full 22 samples. The emphasis on mastery is greater in societies with low segregation, which we have seen tend to be ones with higher inequality to the advantage of men. However, the striking feature here is the absence of a relation between mastery and vertical segregation. The relation with both pay and CAMSIS are significantly close to zero (p < .05). The extent to which there is gender inequality in the occupational structures is quite independent of the degree to which societies value mastery.

Being wealthy

Where an emphasis is placed on the importance of owning expensive things and generally being rich this accompanies low inequality scores on CAMSIS and low horizontal segregation. Thus, the concern with wealth is higher in countries where the status advantage of women is greater, and is lower in countries where men and women tend to be separated in different occupations without inequality. On the other hand, there is no tendency for concern with wealth to vary according vertical pay segregation and a significant lack of relationship with horizontal pay segregation. It appears that the concern for wealth is more often present where men have higher pay than status and women have higher status than pay, which is the

general situation, but in relation to concerns with wealth the trend is particularly clear.

Laissez-Faire Capitalist Values

These are values in favour of *laissez-faire* capitalism: limiting government intervention, whether it be in relation to redistribution of resources or in relation to imposing constraints on market forces. They oppose government involvement in employment, prices, wealth, health, or housing. Here we find the clearest set of relationships with segregation. The relationships are strong for the 15/14 countries for which we have data, and even stronger for the 11 rich industrial countries. There is a clear negative correlation with overall segregation (for G rho = $-.48$, rising to $-.73$ for the rich countries). Most striking, however, is the vertical dimension of pay which correlates $+.64$ and $+.75$ (rich countries) with capitalist values.¹¹ *Laissez-faire* capitalist values are strongly related to male advantage in occupational pay. The free market ideology has often been used to justify no state intervention in labour markets around policies such as equal pay for work of equal value which aim to reduce inequalities in wages between men and women (Jarman, 1991). At the same time there is a distinct tendency for these values to be found where overall segregation and horizontal segregation are low. Where men and women are more likely to work in the same occupations, but where they work in different occupations the women's occupations are badly paid, there we find stronger capitalist values. This pattern is distinct from the other patterns relating to values and, not surprisingly, the opposite of the pattern for perceived ability to influence the work situation.

The countries scoring highest on *laissez-faire* capitalism values are Switzerland, the Czech Republic and Japan. It is interesting and perhaps a little surprising to note the position of the Czech Republic, though Switzerland comes as no surprise. At the other extreme, the lowest commitment to Capitalist values is found in Portugal, Russia and Spain. Russia is as we would expect, while it is interesting to note the position of the far western European countries.

Conservative Values

It is interesting to note that certain values appear to have negligible relations with gender segregation. Here we may note the limited relevance of conservatism. It might be expected that such values would favour the status quo, and perhaps this means no particular pattern of relations.

Influence at Work

Moving on from values, we examine the extent to which individuals perceive that they are actually able to organise their work and influence organisational decisions. While this varies across jobs and companies, there are also variations from one country to the next. There is a tendency for the level of segregation measured by Gini to be directly related to autonomy and influence (rho = $.30$, $p < .1$, $N = 14$), while there appears to be a negative relation with the vertical dimension on pay and a positive relation with the horizontal dimension. When we restrict analysis to the rich industrial countries all relations increase, with the vertical and horizontal pay dimensions becoming significant. For rich countries we find a fairly strong negative correlation with vertical segregation according to pay (rho = $-.49$, $p < .05$) and a

¹¹ For CAMSIS there are data for only 6 countries, too few to establish reliable relation, though the pattern is broadly the same and the relation with O is even significant at $.66$.

strong positive correlation with horizontal segregation ($\rho = .59, p < .05$). The more the different occupations of women and men do not entail inequality in pay, the more they perceive they have control over their work. On the other hand, the greater the advantage to men in terms of pay, the less the workers' perceived influence over their work. Unfortunately there are too few relevant cases to draw any conclusion on CAMSIS. Nevertheless, the result on pay indicates that the higher the autonomy, the less the disadvantage of women on pay. Once again we see the Scandinavian countries are distinctive, with the highest levels of autonomy.

Conclusion

Having examined segregation patterns over a range of countries, we find appreciable national variation. There is a considerable degree of gender segregation in all industrial countries. Even so, there is a wide range from the Nordic countries at the top to the low segregation countries like Romania and Austria.

Perhaps the most important finding is the confirmation of the hypothesis (Blackburn et al., 2000) that overall segregation and the vertical dimension are inversely related. Directly contrary to popular assumptions, overall segregation is not a measure or even a useful indicator of gender inequality; the more women and men work in different occupations, the lower is the gender inequality. In fact, gender inequality is a relatively small part of segregation in most countries.

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 England, 1979; Fox and Suschnigg, 1989; Brooks et al, 2003; Blackburn et al, 2001), 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 men.

A wide range of patterns of segregation emerged as we explored different possible influences.¹² Where countries differ on overall segregation in accordance with particular national characteristics, it does not necessarily mean there are corresponding differences relating to the horizontal or vertical dimensions. Likewise, where there is negligible difference among countries when variables are related to overall segregation, there may be significant vertical or horizontal differentiation. Thus, for example, Catholic countries are not distinctive in terms of overall segregation but within these countries women tend to be more separated but equal and less disadvantaged in terms of pay.

When we approached national differences through various attitudes we again found a variety of patterns. Of all the variables we considered, *Laissez-faire* capitalist values provided the strongest relationship with segregation, and these relationships were particularly strong when we considered just the rich industrial countries. Negative correlations with overall and horizontal segregation were accompanied by even stronger positive association with vertical pay inequality. *Laissez-faire* capitalist values are found where overall segregation is relatively low but there is strong income inequality in favour of men. Mastery - the emphasis on evident achievement - has a similar association with low overall segregation, but a total absence of

¹² Because of smaller sample sizes, national variations in stratification were less likely to be significant than variations in pay.

relation with inequality in pay or stratification. Not surprisingly this contrasts with egalitarianism, in that egalitarianism is linked with high levels of overall segregation, while there is again a total absence of relation with inequality, at least as measured by pay.

In contrast to these values, the desire to be wealthy has only a slight, non-significant link with overall segregation and male advantage in pay, but is found with stratification favouring women and low levels of difference with equality. More extreme is the significant absence of relation between valuing intellectual autonomy and overall segregation, while the value is clearly associated with male advantage in the stratification hierarchy. Autonomy in controlling and influencing the organisation of work shows a quite different pattern. This value is found where overall segregation is high, and at least in the rich countries, there is a low level of income inequality. Though the relations are much weaker, this takes us full cycle from the pattern for capitalist values.

While there is a considerable variety in the national patterns of segregation, a number of distinctive groups of countries can be identified. The Scandinavian countries Finland, Sweden, and Denmark are distinctive, having exceptionally high overall segregation together with rather low vertical segregation and a general pattern of equality. Interestingly, with some of the highest levels of overall segregation, the labour forces of the three Scandinavian countries were also found to have the highest perceived control over work environment in the sample of 30 countries. The five Catholic countries have a very low pay inequality together with a very high degree of separation of men and women in different but equal occupations. Three of these countries (Brazil, Mexico and Hungary) along with South Africa have a distinctively low GDP per capita, and South Africa also has one of the lowest levels of pay gap between men and women and one of the highest levels of horizontal segregation. Thus Catholicism and low GDP go together with low vertical and high horizontal segregation.

As we have seen, there is considerable variation across countries in the patterns of segregation, with a range of distinctive influences on the patterns. While the general structure of relations between overall segregation and its dimensions is clear, there is a need for further investigation of the determinants of the national variations. Further research needs to include analysis of historical developments leading to the present situation. It is important to understand the bases of gender inequality and difference in employment.

Appendix. Sources of data and available country data for each indicator

COUNTRY	Source ¹	Occ. Cat. ²	Pay	CAMSIS	GDP	Invest. in Technology	HDI	GDI	GEM	Female economic activity	Income inequality	Protestant Religion ³	Catholic Religion ⁴	Cultural Values	Capitalist Values	Influence at work
Argentina	C	167			X	X	X	X	X	X	X		X			
Austria	E	102	X	X	X	X	X	X	X	X	X		X	X		X
Belgium	E	108		X	X	X	X	X	X	X	X		X	X		X
Brazil	C	494	X		X	X	X	X	X	X	X		X			
Bulgaria	I	89			X	X	X	X	X	X	X			X		X
Czech Republic	E	103	X	X	X	X	X	X	X	X	X			X	X	X
Denmark	E	103	X	X	X	X	X	X	X	X	X	X		X	X	X
Ecuador	C	114			X	X	X		X	X	X		X			
Finland	E	100	X		X	X	X	X	X	X	X	X		X	X	X
Germany	E	105	X	X	X	X	X	X	X	X	X			X		X
Greece	E	103			X	X	X	X	X	X	X			X		X
Hungary	E	106	X	X	X	X	X	X	X	X	X		X	X	X	X
Italy	E	102			X	X	X	X	X	X	X		X	X		X
Japan	I	89	X		X	X	X	X	X	X	X				X	
Luxembourg	E	98		X	X	X	X	X		X			X	X		X
Mexico	C	457	X		X	X	X	X	X	X	X		X			
Netherlands	E	104	X		X	X	X	X	X	X	X			X	X	X
Poland	E	104		X	X	X	X	X	X	X	X		X	X	X	X
Portugal	E	106	X	X	X	X	X	X	X	X	X		X	X	X	X
Romania	E	371		X	X	X	X	X	X	X	X			X		X
Russia	I	109	X	X	X	X	X	X	X	X	X			X	X	X
Slovakia	E	107		X	X	X	X	X	X	X	X		X	X		X
Slovenia	E	99	X	X	X	X	X	X	X	X	X		X	X	X	X
South Africa	C	135	X		X	X	X	X		X	X	X			X	
South Korea	I	110	X		X	X	X	X	X	X	X				X	
Spain	E	106	X		X	X	X	X	X	X	X		X	X	X	X
Sweden	E	104	X	X	X	X	X	X	X	X	X	X		X	X	X
Switzerland	E	105	X	X	X	X	X	X	X	X	X			X	X	X
UK	E	105	X	X	X	X	X	X	X	X	X	X		X		X
USA	C	470	X	X	X	X	X	X	X	X	X	X				

¹ Source: 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.

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

^{3,4} Protestant and Catholic countries only.

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