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Is There a Worldwide Sex Segregation Regime?

As the field of gender stratification matures, it remains as fashionable as ever to debate the sources and causes of occupational segregation, while the logically prior task of mapping the descriptive contours of segregation continues to attract rather less attention. By virtue of this emphasis, the field has yet to provide a truly comprehensive portrait of sex segregation within industrial market economies, nor has it resolved whether a broad similarity in segregation regimes might be produced through diffusion, socio-biological imperatives, or the functional requisites of modernity. Although there is of course a standing literature on these matters, much of the existing work suffers from problems of data, methods, or conceptualization, and there is evidently no great rush among sex segregation scholars to move the field beyond these formidable problems. In the present chapter, we take matters of description more seriously than has heretofore been the case, with our main objective being to provide a detailed portrait of the underlying structure of sex segregation within industrial and advanced industrial market economies. This descriptive portrait will allow us to adjudicate, albeit only partially, between competing accounts of the sources of cross-national variability and commonality in segregation regimes.

There are three lines of research directly relevant to these objectives. The dominant

approach, at least among American scholars, has been to apply conventional segregation indices (e.g., the index of dissimilarity) to aggregate classifications available from international statistical abstracts, most notably the *Yearbook of Labour Statistics* published by the International Labour Office (e.g., Anker 1998; Jacobs and Lim 1995; 1992; Blau and Ferber 1998; Blackman, Jarman, and Siltanen 1993). This research tradition has the great virtue of representing a relatively broad cross-section of countries, but it is necessarily flawed given that conventional indices conflate the underlying pattern of sex segregation with the structure of labor supply and demand (see Charles and Grusky 1995). At the other end of the continuum, one might cite the great many qualitative case studies of sex segregation, some of which suggest that occupational gender-typing can be highly idiosyncratic and path dependent (e.g., Reskin and Roos 1990; Bradley 1989; Lapidus 1985; Sanday 1981; Boserup 1970). This line of research, although quite revealing, perforce suffers from the limitations of all case studies; namely, one cannot know whether the discrepant patterns are indeed isolated idiosyncrasies or instead indicate more pervasive cross-national variation, nor is it possible to systematically control for cross-national variability in labor supply and demand. In recent years, a third tradition of log-multiplicative modeling has emerged, with the conventional data source for such research again being the aggregate compilations of the

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International Labour Office (e.g., Charles and Grusky 1995; Charles 1992; Semyonov and Jones 1999; Cartmill 2000; Chang 2000). For all its methodological rigor, this line of research is vulnerable to the possibility that aggregate categories comprise widely different types of detailed occupations, thereby creating the appearance of real cross-national variability in segregation when in fact the occupational structure alone is variable. This possibility, if borne out, directly undermines our long-standing interest in mapping patterns of sex segregation after purging the confounding effects of variability in labor supply and demand.

We shall thus proceed by applying our log-multiplicative approach (Charles and Grusky 1995) to a new archive of carefully harmonized and highly detailed cross-classifications of sex by occupation. Although our principal contribution involves, then, the application of new methods to new disaggregate data, we also make conceptual headway by distinguishing between various types of cross-national variability and specifying the social forces and processes that underlie these types.

The Forms and Sources of Cross-National Similarity

In our prior critiques of segregation analysis (e.g., Charles and Grusky 1995), we have noted that conventional segregation indices

are problematic not merely for various methodological reasons but also because they focus exclusively on the *degree* of segregation, thereby concealing qualitative differences between segregation regimes. As indicated in Table 1, one might usefully distinguish between five types of cross-national similarity and variability, each of which may be associated with a specific "theory" about the forces accounting for sex segregation. The purpose of the present section is to contrast these various types of similarity and to elaborate the competing theories of sex segregation that might be regarded as underlying these types.

The first model of Table 1 allows the forces of supply and demand (i.e., the gender and occupation margins) to vary by country, whereas the residual densities of sex-by-occupation association are constrained to be invariant. This model implies that a genotypical pattern of sex segregation emerges after controlling for cross-national variability in (1) the relative sizes of occupations (i.e., the "demand for labor") and (2) rates of female labor force participation (i.e., the "supply of labor"). In motivating this model, one cannot rely directly on conventional explanatory theories of sex segregation (e.g., queuing, sex-role theories), because these speak to the generic and universal causes of segregation without addressing whether such causes will be modified or transformed as they play out in particular countries. Although most ex-

TABLE 1
The Structure of Cross-National Similarity and Variability in Sex Segregation Regimes

<i>Forms of Invariance</i>	<i>Sources of Residual Variability</i>	<i>Examples of Relevant Scholars</i>
1. Complete invariance	None	Chodorow; Reskin & Roos
2. Profile invariance	Variability in the diffusion of egalitarian values and institutions	Parsons; Goode
3. Micro-level invariance	Macro-level structural forces	Chang; Charles; Brinton
4. Macro-level invariance	Occupation-specific institutional and historical forces	Charles & Grusky
5. Complete variability	All of the above	Tilly; Scott; Bradley

planatory theorists have not, therefore, directly taken up issues of cross-national variability, their long-standing emphasis on the generic forces making for segregation suggests that the cross-nationally common element is expected to dominate and overwhelm the idiosyncratic component. That is, insofar as the forces making for segregation indeed operate similarly in all countries, one would necessarily anticipate a worldwide family resemblance in the basic features of segregation.¹

In the above sense, conventional explanatory theories may be seen as consistent with type 1 invariance, but of course only with the additional caveat that the contours of the (putatively) shared regime are themselves a matter of disagreement. The main lines of contention are easily summarized; namely, one might distinguish between (1) theories of sex-typing that emphasize the deep-rooted and near universal identification of women with tasks involving service, reproduction, and nurturing (e.g., Chodorow 1978; Beck-Gernsheim and Ostner 1978), and (2) theories of male privilege (or "patriarchy") that emphasize the power of men to dominate the most desirable occupations (e.g., Reskin and Roos 1990; Walby 1986; Strober 1984; Hartmann 1976) as well as the incentives for women, in the context of such patriarchy, to opt for "undesirable" occupations that require a less substantial commitment to the labor force (e.g., Becker 1985; Mincer and Polachek 1974). The former theories speak principally to the "sectoral segregation" of women into non-manual occupations that emulate and reproduce their service-providing role in the domestic sphere; and the latter theories speak principally to the "gradational segregation" of women into undesirable manual and non-manual positions that can be reconciled with their domestic responsibilities. The advocates for these various theories naturally wish to represent them as complete and self-standing accounts; however, we suspect that the shared segregation profile will reveal the interleaving of sectoral and gradational forces that, for the

most part, may be regarded as complementary rather than mutually exclusive.

If type 1 invariance proves inconsistent with the data, it is still possible that a more limited form of profile invariance will obtain. As indicated in Table 1, the underlying segregation profile may take on the same basic shape in all countries, whereas the degree of segregation may vary from country to country (see line 2). This formulation is consistent with the long-standing presumption of stratification scholars that any residual cross-national variability in segregation will necessarily take the form of differences in degree rather than kind. The logic underlying this assumption has not, however, been laid out in any careful or sustained way, no doubt because the available measures have all been scalar and hence scholars have naturally defaulted to them without any consideration of (unavailable) alternatives. As new measures and methods emerge, it is perhaps useful to ask whether a type 2 formulation can be reconciled with contemporary understandings of segregation regimes and their internal operation. We have suggested in Table 1 that such a reconciliation is indeed feasible; as shown here, one need merely assume that segregation systems are tightly coupled and well-integrated, with local patterns of segregation thus reflecting a wider system logic rather than purely occupation-specific dynamics. The resulting imagery suggests, then, a neo-Parsonian approach in which segregation practices throughout the occupational structure are the institutional realization of systemwide values regarding the legitimacy or illegitimacy of inequality (Parsons 1970; Goode 1963). The foregoing account might be contrasted with one that treats segregation regimes as more loosely coupled; that is, egalitarian practices in one sector of the occupational structure may sometimes be conjoined with highly discriminatory practices in another, thereby leading to more complex patterns of cross-national difference than a type 2 formulation allows.

If a type 2 model fails to fit the data, we are unwilling to resort directly to simple historicist formulations emphasizing that past arrangements live on and persist in unique country-specific form. We have instead suggested the fallback position (see line 3) that cross-national variability may be principally expressed at the level of major occupational categories (e.g., professional, clerical, craft; see Table 4 in the Appendix for a full listing). Under this formulation, the residue of segregation at the micro-level of highly detailed occupations (e.g., professor, office clerk, cabinetmaker) is regarded as less mutable, because it reflects the universal facts of patriarchy that allow males everywhere to dominate the most desirable occupations. This line of argumentation, although not explicitly laid out in the literature, is nonetheless consistent with conventional institutionalist approaches focusing on cross-national variability in aggregate patterns of segregation (see especially Chang 2000). For example, Brinton (1988) has suggested that Japanese women are disproportionately found in the semiskilled manual sector, where the returns to firm-specific capital are so limited that workers returning from extended family-related leaves are only trivially penalized. We might cite similarly prominent stories about female "overcrowding" in the Scandinavian service sector (Ruggie 1984; Charles 1992), the American managerial sector (Chang 2000), and the Turkish professional sector (Charles and Grusky 1995). Although countries may differ, then, in patterns of labor supply to major occupational groupings, such institutional variability is presumably overlaid on the more fundamental conditions of patriarchy that guarantee micro-level male advantage in the competition for desirable occupations *within* major categories.

It is a striking indication of how poorly the field is developed that the obverse position is no less credible (see line 4). That is, one might plausibly argue that macro-level patterns of segregation take on much the same shape everywhere, whereas labor practices at the micro-occupational level are subject to idiosyncrasies of all sorts, most notably those re-

flecting (1) the particular constellation of tasks assigned to an occupation (and the associated desirability of that occupation); (2) the types of labor that were available when the occupation expanded and carried out its formative recruiting; and (3) the types of firms, industries, or occupations that served as "models" for employment practices when the occupation was established or expanded (see Stinchcombe 1965 for a related argument). The foregoing considerations imply a form of path dependency whereby early decisions regarding the gender-typing of an occupation are definitively shaped by quite local and nation-specific considerations. By contrast, segregation at the macro-level may be determined by more fundamental and less variable forces, such as the worldwide diffusion of traditional gender roles. This line of reasoning suggests that the deep structure in segregation data will only be uncovered by first filtering out nation-specific noise at the detailed occupational level.

We are left, finally, with the extreme position that no deep structure exists and that cross-national variability is accordingly too complex to be captured even by the weakened formulations that we have just rehearsed (see line 5). The historical record indicates, of course, that segregation of some kind is universal, yet many scholars have emphasized that it takes on historically contingent forms that can only be understood through careful qualitative study (Blekher 1979; Dodge 1971; see also Bradley 1989; Scott 1986; Tilly and Scott 1978). This position has been compellingly argued; however, given that its adherents draw principally on case studies, one cannot know whether the cited idiosyncrasies are isolated examples or indicative of more pervasive variation, nor can one formally test for the more complex and subtle forms of cross-national similarity that we have outlined in Table 1. The results presented below provide, then, the first comprehensive evidence of the extent to which the distinctive cultures, histories, and institutions of countries live on in ways that shape their segregation profiles.

Sex Segregation Models

We proceed by fitting models that correspond to the various formulations listed in Table 1. For example, model 1 allows for cross-national variability in the occupational structure and in female labor supply, but constrains all sex-by-occupation interaction to be cross-nationally invariant. This model of all two-way interactions can be represented as follows:

$$m_{ijk} = \alpha_k \beta_{ik} \gamma_{jk} \delta_{ij} \tag{1}$$

where *i* indexes sex, *j* indexes occupation, *k* indexes country, α_k is the grand mean in the *k*th country, β_{ik} is the country-specific marginal effect for the *i*th gender, γ_{jk} is the country-specific marginal effect for the *j*th occupation, and δ_{ij} is the sex-by-occupation interaction for the *ij*th cell in each country.²

If this model fails to fit, we might ask whether cross-national variability arises principally from simple differences in the *degree* of sex segregation (see line 2, Table 1). The centerpiece of our modeling approach is a multiplicative shift model that is consistent with the conventional practice of summarizing cross-national variability in a single parameter (i.e., an index). This model takes the form:

$$m_{ijk} = \alpha_k \beta_{ik} \gamma_{jk} e^{\Phi_k Z_i v_j} \tag{2}$$

where Φ_k is the multiplicative shift effect for the *k*th country, Z_i is an indicator variable for gender (i.e., $Z_1 = 0$ and $Z_2 = 1$), and v_j is the scale value for the *j*th occupation. If this specification fits the data, it follows that Φ_k can be used to represent variability in the underlying strength of sex segregation.³ We thus reject the common practice of simply assuming that a scalar index is empirically viable. Indeed, the frequently issued platitude that segregation indices should be selected on the basis of “research interests” is insufficiently stringent, because it makes no allowance for the possibility that the preferred measure fails to adequately characterize the data at hand. It is high time that ad-

vocates of particular indices be held accountable for the data reduction that their indices imply.

If the model of equation (2) also fails to fit, we can conclude that the occupation-specific contours of sex segregation (i.e., the “segregation profile”) are variable across countries. The main problem with conventional index-based approaches is that qualitative differences in the segregation profile are ignored altogether and emphasis is instead placed on simple differences in the degree of segregation. The models presented in Charles and Grusky (1995) serve to properly refocus attention on the underlying profile itself. Although the task of modeling such profiles is not always an easy one, we can simplify matters for our present illustrative purposes by relying, without loss of generality, on the following saturated model:

$$m_{ijk} = \alpha_k \beta_{ik} \gamma_{jk} e^{Z_i v_{jk}} \tag{3}$$

Under this specification, the scale values (v_{jk}) are now subscripted by *k*, thus implying that the segregation profile freely varies by country. These scale values can be used to calculate a summary index, *A*, that allows for qualitative variability in the underlying structure of segregation.⁴

We consider, finally, a closely related model that estimates the net residue of segregation at the aggregate level after the data are purged of all lower-order compositional effects (see Charles and Grusky 1995, 952–53). This simple multilevel model, which is also saturated, can be represented as:

$$m_{ijk} = \alpha_k \beta_{ik} \gamma_{jk} e^{Z_i v_{jk} + Z_i \phi_{ck}} \tag{4}$$

where ϕ_{ck} refers to the scale values for major occupational categories (indexed by *c*), and v_{jk} refers to the scale values for detailed occupations nested in these major categories.⁵ In estimating this model, we opt to parameterize the structure of segregation at multiple levels, thus allowing us to determine whether a deep commonality emerges for either major or minor occupational categories (see Grusky and Charles 1998).

A New Cross-National Data Archive

Although the foregoing models have been applied previously (e.g., Charles and Grusky 1995), our occupational classification is altogether new. We apply a 64-category classification that relies heavily on recent efforts of the National Statistical Institutes of the European Union to establish a single harmonized variant of the 1988 International Standard Classification of Occupations (see the Appendix for a listing of our classification). The resulting classification, dubbed ISCO-COM, has garnered widespread support within the European Union, but most member countries have not yet published sex segregation arrays based on the new protocol. We have nonetheless moved forward by (1) commissioning national statistical agencies to process individual-level census data as mandated by ISCO-COM, (2) securing highly detailed segregation arrays and recoding them in accord with such translation keys as are presently available, or (3) developing translation keys of our own and applying them to detailed segregation data. By virtue of ISCO-COM, it thus becomes feasible to standardize more rigorously than was heretofore possible, but of course some misclassification inevitably remains because of inadequate detail in the in-

digenous schemes or because of real cross-national variability in the division of labor itself (Elias and Birch 1993; 1994).⁶ For the present study, we carry out analyses for 10 countries (see Table 2) that can be coded into our ISCO-COM classification with relatively little error, as this insistence on high-quality data constitutes our main comparative advantage relative to previous, more inclusive studies.

Tests of Cross-National Invariance

We begin our analysis by testing the simple claim that patterns of sex segregation are cross-nationally invariant once the confounding effects of labor supply and demand are parsed out (see equation 1). The L^2 statistic for this model registers as high as 1,763,819 (with 567 df), while the index of dissimilarity (Δ) indicates that 5.5 percent of the respondents must be reclassified to bring about a perfect correspondence between the observed values and those implied by the model. Although some scholars might characterize this fit as adequate (especially because $\Delta = 5.5$), it bears emphasizing that our more complicated models (see below) reveal rather substantial cross-national differences in both the underlying strength and pattern of segregation. We can conclude that the model of complete invariance suppresses much variability in the basic parameters of segregation.

In our next model, we allow the overall level of segregation to be cross-nationally variable, but continue to constrain the underlying segregation curve to take on the same shape in each country (see equation 2). Under this specification, we find that only 14 percent of the total cross-national variability in sex segregation is explained, with the remaining variability attributable to cross-national differences in the segregation profile itself.⁷ The latter result implies that gender stratification systems are only poorly integrated and that pockets of extreme segregation and integration can therefore coexist in the same country. The standard presumption that the nation-

TABLE 2
Sources and Sample Characteristics
for Ten-Nation Data Set

Country	Census Year	Sample Size	Percent Female
Italy	1991	21,071,282	35.7
United States	1990	1,152,885	45.7
West Germany	1993	128,912	41.2
Portugal	1991	4,037,130	40.5
Sweden	1990	4,059,813	48.6
Switzerland	1990	3,076,445	38.0
Japan	1990	12,220,974	39.8
France	1990	900,255	43.0
Belgium	1991	3,418,512	39.8
United Kingdom	1991	2,405,091	44.3

state is a natural (or at least adequate) unit of analysis must accordingly be questioned; that is, attempts to understand cross-national variability in sex segregation as an outgrowth of either “woman-friendly” or “male-centered” national policies, institutions, and cultures are overly simplistic. The poor fit of this model implies either that (1) national values, policies, and institutions have occupation-specific effects (e.g., occupationally targeted affirmative action policies), or (2) segregation is driven not by national variables but by local occupation-specific forces (e.g., occupation-specific cultures, union practices). These interpretations are consistent with our premise that conventional index-based approaches should be supplemented with more careful study of segregation profiles.

The preceding results suggest, then, that cross-national variability at the detailed level cannot be characterized in any simple fashion, but it is still possible that a deeper commonality obtains at the aggregate level of major occupational groups. This hypothesis can be tested by fitting a model that estimates the net residue of segregation at the aggregate level after purging the data of lower-order compositional effects (see equation 4). The macro-level estimates from this model, as graphed in Figures 1A and 1B, do indeed reveal a rather striking similarity in the segregation curves.⁸ Although the underlying profile is not cross-nationally identical, such variability as exists may be interpreted as a simple strengthening or weakening of a fundamentally shared pattern (compare Figures 1A and 1B). In this sense, modern segregation has a deep structure underlying it, albeit one that only emerges when all micro-level variability is stripped away.⁹

In characterizing these figures, we would suggest that sectoral and gradational principles are simultaneously at work, with the former principle accounting for the crowding of women into the nonmanual sector, and the latter principle accounting for the tendency of men to dominate the most desirable occupations in both sectors (i.e., managerial and craft occupations). The combination of these

two forces yields the characteristic “leaning-N” profile of Figures 1A and 1B. This pattern emerges because, within both the manual and nonmanual sectors, the major occupational categories have been listed in order of declining desirability, or at least approximately so. The upward-sloping lines within each sector thus reveal that men are advantaged in securing the most desirable occupations (i.e., the gradational principle). However, a simple gradational story cannot fully explain the observed profile, because we also find a marked disjuncture in scale values at the manual–nonmanual barrier. This disjuncture reflects the operation of the sectoral principle; that is, there is a characteristic crowding of women into the nonmanual sector, even though the occupations within that sector are *more* desirable, on average, than those in the manual sector.

The observed commonalities can be attributed, then, to primitive segregating principles that are operative in all societies but expressed to varying degrees. As noted above, the same “leaning-N” pattern appears in both figures, yet is clearly attenuated in the case of Figure 1B. This attenuation appears both in the form of a diminished between-sector disjuncture (i.e., a weakened sectoral effect) as well as diminished within-sector slopes (i.e., a weakened gradational effect). It is striking in this regard that our two less-developed countries (i.e., Portugal and Italy) both appear in the moderate segregation profile. This result is consistent with arguments suggesting that, as industrialism advances, many traditionally female tasks differentiate out of the household economy and are incorporated into the paid economy (e.g., childcare), thereby drawing increasing numbers of women into highly segregated sectors of the labor market (see Charles 1992 for details).

The micro-level estimates from our model are next graphed in Figure 2. As might be anticipated, the scale values for virtually all occupations are quite widely scattered, thus suggesting that the forces of micro-level segregation manifest themselves in highly variable ways. The segregation of detailed occupations

FIGURE 1B
Aggregate profile for moderate segregation pattern

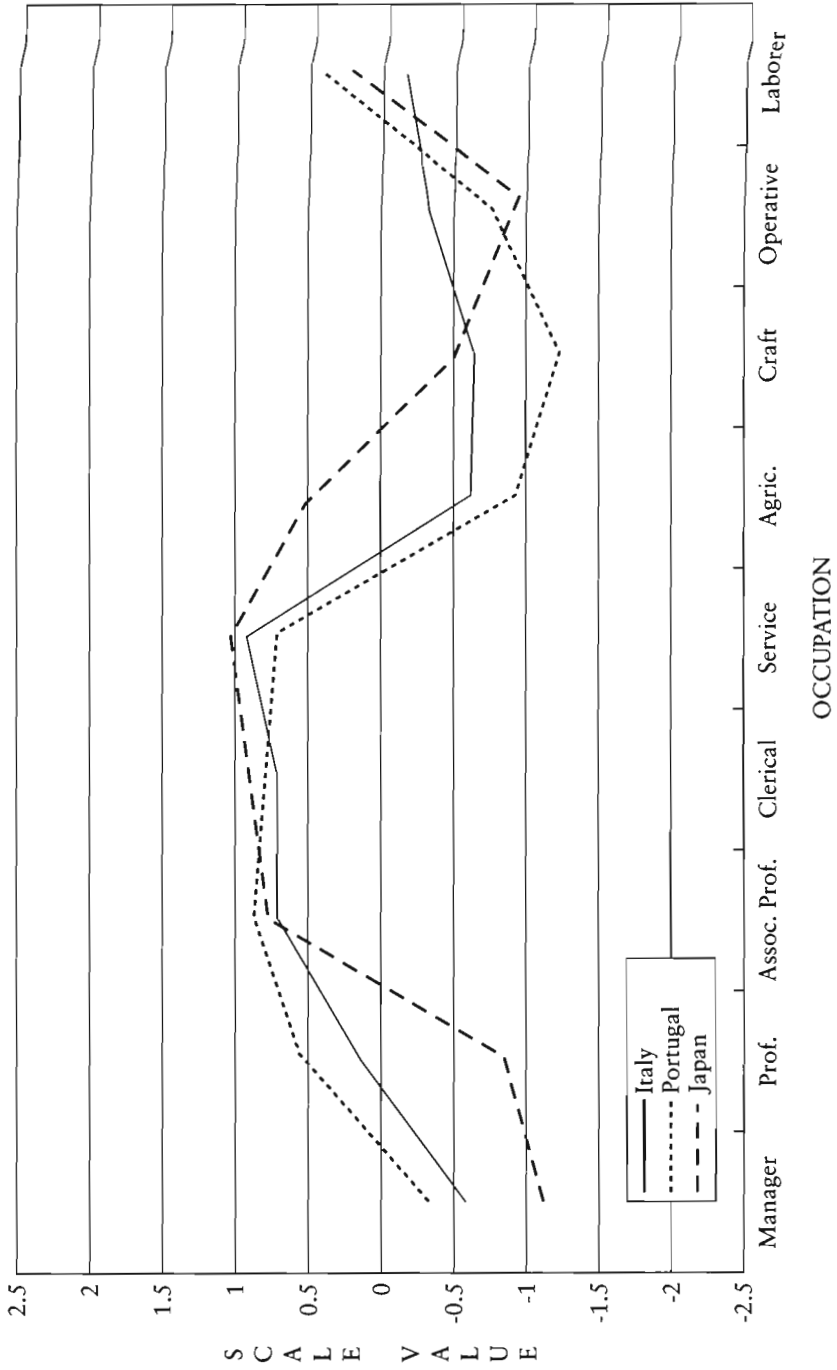
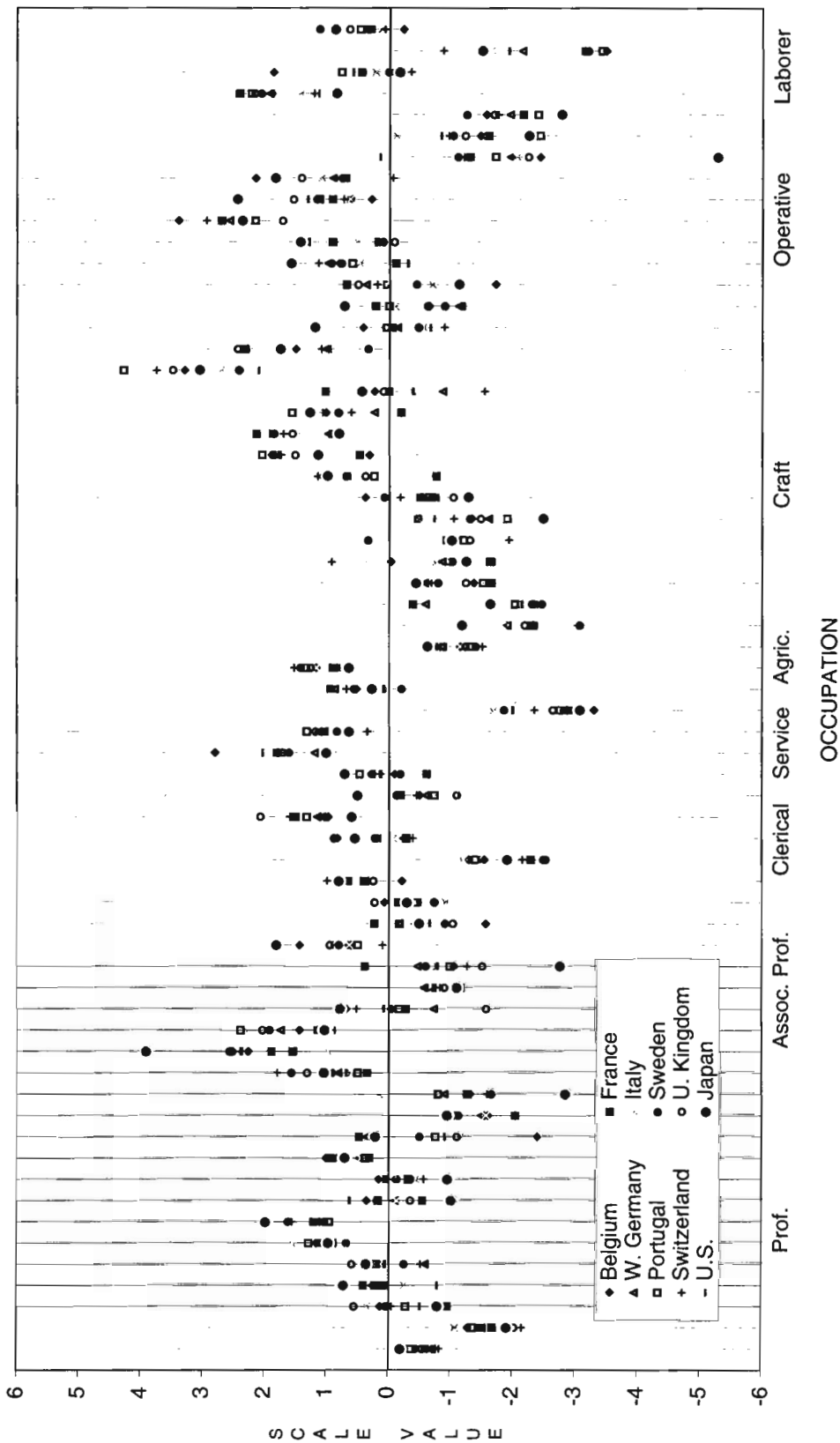


FIGURE 2
Cross-national dispersion in purged scale values



may reflect such idiosyncratic processes as (1) the types of firms, industries, or occupations that served as models for hiring practices when the occupation was established or expanded; (2) the closure strategies (e.g., unionization, credentialing) that occupational incumbents seized upon in attempting to monopolize skilled tasks; (3) the "women-friendliness" of the owners, unions, and managers involved in occupational staffing and recruitment; and (4) the gender composition of the labor force when the occupation expanded and carried out its formative recruiting. These processes all suggest a form of path dependency whereby local and particularistic forces influence the initial gender-typing of occupations and shape the subsequent trajectory of development (Stinchcombe 1965; Weeden and Sørensen forthcoming). The resulting cross-national variability is accordingly more complicated than that prevailing at the macro-level.

The foregoing results make it clear that all sex segregation indices, conventional or otherwise, are inappropriate for the present data. If summary measures are still insisted upon, we would do well to rely on a margin-free measure that does not condition on a common segregation profile (i.e., *A*). For each of our 10 countries, we have thus presented *A* as well as the more conventional index of dissimilarity (*D*), the latter serving as a useful point of comparison. As shown in Table 3, our association index reveals considerable cross-national variability not merely in the patterning of segregation, but also in its underlying strength. The United Kingdom, for example, is nearly twice as segregated as Italy; that is, males or females are overrepresented in the typical occupation by a factor of 6.28 in the United Kingdom, but only by a factor of 3.31 in Italy. The values of *A* for Belgium and France are nearly as high (i.e., *A* = 6.10), whereas Japan, Switzerland, Sweden, and Portugal assume a middling position in the hierarchy. Although Japanese segregation has been characterized in the past as surprisingly weak (e.g., Brinton and Ngo 1993), the present results indicate that, when *A* is applied to

TABLE 3
Scalar Measures of Sex Segregation

Country	Segregation Index	
	<i>A</i>	<i>D</i>
Italy	3.31	43.0
United States	4.39	45.1
West Germany	4.50	50.9
Portugal	5.26	47.7
Sweden	5.47	60.2
Switzerland	5.52	55.5
Japan	5.87	44.8
France	6.10	54.5
Belgium	6.10	51.2
United Kingdom	6.28	56.5

Note: *A* = Association Index; *D* = Index of Dissimilarity.

disaggregate data, Japan is restored to its rightful place as a moderately segregated country. By contrast, the United States joins Italy at the low end of the continuum, with *A* implying in this case that males or females are overrepresented in the typical occupation by a factor of only 4.39. This is nonetheless a strikingly high level of segregation insofar as the universalistic and egalitarian values of modern societies are taken seriously.

Conclusions

We led off this chapter by suggesting that segregation analysts have turned prematurely to explanatory modeling without first establishing the most basic descriptive contours of sex segregation. In accounting for this state of affairs, it is surely relevant that the requisite data have until now been unavailable, but it is equally problematic that adequate models and methods have likewise been lacking. We have sought to make progress on all fronts by distinguishing between different types of similarity and difference, by developing log-multiplicative models that correspond to these types, and by applying our models to a new archive of rigorously harmonized segregation data. This approach allows us to produce the

first detailed mapping of sex segregation within industrial and advanced industrial market economies.

The results from our mapping exercise reveal so much variability in patterns of micro-level segregation that we are naturally led to historicist and institutionalist accounts of the more radical variety (e.g., Scott 1986). Although a long tradition of case study scholarship has identified discrepant sex-typing among particular occupations (e.g., Lapidus 1985), it was unclear whether the cited idiosyncrasies were isolated examples or indicative of more pervasive variation. We can now suggest that the distinctive histories and institutions of countries live on in ways that fundamentally shape their segregation profiles. The imagery that emerges, then, is that of loosely coupled segregation systems cobbled together from many occupation-specific "solutions" to the exigencies of modern industrial production and competing segregative and egalitarian cultural mandates.

This is not to suggest that the model of complete variability (line 5, Table 1) is to be preferred. Although observed patterns of segregation are indeed cross-nationally variable and idiosyncratic, a deeper commonality is detectable once the more chaotic features of micro-level segregation are statistically removed. The resulting macro-level segregation curves are fundamentally hybrid in character; that is, the "sectoral principle" accounts for the disproportionate allocation of women into the service-based nonmanual sector, and the "gradational principle" accounts for the simultaneous channeling of women into the least desirable occupations within both the manual and nonmanual sectors (see Charles and Grusky forthcoming). The first principle is consistent with models suggesting a reproduction of domestic gender roles in the formal economy, and the second principle is consistent with queuing models of male advantage. These two principles operate to varying degrees in all societies and hence produce fundamental commonality in the underlying structure of segregation.

Notes

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1. This is not to suggest that segregation regimes evolve in strict isolation from one another. To the contrary, the gender labels that are characteristically attached to occupations may well diffuse across national borders, thus generating cross-national similarities in the discriminatory tastes of employers and the sex-typed aspirations of workers. The foregoing process is likely fueled by the proliferation of transnational business networks as well as the growing normative authority of international political and social organizations (e.g., United Nations, World Bank).

2. The marginal effects for this model are identified by constraining the parameters for the first row and column to equal 1 (in each country), and the sex-by-occupation interaction effects are identified by constraining the parameters in the first row and column to equal 1 (in each country).

3. The scale values for this model are identified by constraining them to sum to 0, and the marginal and shift effects are identified by constraining the parameters for the first row, column, or level to equal 1 (see Charles and Grusky 1995, 938–39).

4. We follow Charles and Grusky (1995, 945) in defining A as $\exp(1/J \times \sum_{jk}^2)^{1/2}$. The closed-form solution for A is $\exp(1/J \times \sum(\ln(F_{jk}/M_{jk}) - [1/J \times \sum \ln(F_{jk}/M_{jk})])^2)^{1/2}$, where M_{jk} and F_{jk} refer to the number of males and females in the j^{th} occupation and k^{th} country.

APPENDIX
Recording Rules for Translating ISCO-88 into 64-Category Classification

<i>Occupation</i>	<i>ISCO-88 Codes</i>	<i>Occupation</i>	<i>ISCO-88 Codes</i>
<i>A. Manager (MA)</i>	111, 112, 114,	<i>F. Agric. & Fishery (AG)</i>	
Manager	121-123, 131	Farmer	611-613, 921
<i>B. Professional (PR)</i>		Forestry & Fishery	614, 615
Physical Science	211-213	<i>G. Craft (CR)</i>	
Architect & Engineer	214	Miner & Cutter	711, 712
Life Science	221	Building Finisher	713
Health	222	Painter & Related	714
Professor	231	Metal Moulder & Related	721
Secondary Teacher	232	Blacksmith & Related	722
Other Teacher	234, 235	Machinery Mechanic	723
Business Professional	241	Electrical Mechanic	724
Lawyer & Related	242	Metal Precision	731
Social Science & Related	243-245, 247	Handicraft	732, 733
Religious Professional	246, 348	Printing & Related	734
<i>C. Associate Prof. (AP)</i>		Food Processing	741
Physical Science	311, 312	Cabinet-Maker	742
Inspector & Related	313-315	Textile & Garment	743
Life Science & Health	321, 322	Pelt, Leather, & Shoe	744
Nursing & Midwife	223, 323	<i>H. Operative (OP)</i>	
Primary Teacher	233, 331, 332	Wood Processing	814
Other Teacher	333, 334	Other Stationary-Plant	811-813, 815-817
Finance & Sales	341	Metal & Mineral	821
Agent & Broker	342	Chemical & Related	822, 823
Admin. & Social Work	343, 346	Wood Product Operative	824, 825
Customs, Tax, & Related	344, 345	Textile & Related	826
Art, Entertaining, & Sport	347	Food & Related	827
<i>D. Clerical (CL)</i>		Assembler	828, 829
Office Clerk	411, 412, 414, 419	Locomotive	831
Material-recording	413	Motor Vehicle	832
Cashier & Teller	421	Mobile Plant Operator	833, 834
Client Information	422	<i>I. Laborer (LA)</i>	
<i>E. Service & Sales (SS)</i>		Vendor & Domestic	911-914, 916
Travel Attendant	511	Messenger & Related	915
Housekeeping & Related	512	Mining & Construction	931
Personal Care & Related	513	Manufacturing & Related	932, 933
Other Personal Service	514		
Protective Service	516		
Salesperson & Related	521, 522		

5. The micro-level scale values (v_{jk}) can be identified by constraining them to sum to 0 within each major occupational category, and the macro-level scale values (ϕ_{ck}) can be identified by constraining them to sum to 0 within each country.

6. These errors in coding, classification, and aggregation are addressed elsewhere in more detail (Charles and Grusky forthcoming).

7. The L^2 value for this model is 1,517,231 (with 558 df) and the index of dissimilarity (Δ) is 5.1.

8. In all of our figures, positive scale values indicate female overrepresentation, and negative scale values indicate male overrepresentation.

9. These graphs do of course reveal *some* macro-level variability that is consistent with the arguments of Chang (2000), Charles (1998; 1992), Brinton (1988), and others.

References

- Anker, Richard. 1998. *Gender and Jobs: Sex Segregation of Occupations in the World*. Geneva: ILO.
- Beck-Gernsheim, Elisabeth, and I. Ostner. 1978. "Frauen verändern—Berufe nicht?" *Soziale Welt* 29:257–87.
- Becker, Gary S. 1985. "Human Capital, Effort, and the Sexual Division of Labor." *Journal of Labor Economics* 3:33–58.
- Blackburn, Robert M., Jennifer Jarman, and Janet Siltanen. 1993. "The Analysis of Occupational Gender Segregation Over Time and Place: Considerations of Measurement and Some New Evidence." *Work, Employment, and Society* 7: 335–62.
- Blau, Francine D., and Marianne A. Ferber. 1998. *The Economics of Women, Men, and Work*. Upper Saddle River, NJ: Prentice Hall.
- Blekher, Feiga. 1979. *The Soviet Woman in the Family and in Society*. New York: Wiley.
- Boserup, Ester. 1970. *Woman's Role in Economic Development*. London: Allen & Unwin.
- Bradley, Harriet. 1989. *Men's Work, Women's Work: A Sociological History of the Sexual Division of Labour in Employment*. Minneapolis: University of Minnesota Press.
- Brinton, Mary C. 1988. "The Social-Institutional Bases of Gender Stratification: Japan as an Illustrative Case." *American Journal of Sociology* 94:300–34.
- Brinton, Mary C., and Hang-Yue Ngo. 1993. "Age and Sex in the Occupational Structure: A United States–Japan Comparison." *Sociological Forum* 8:93–111.
- Cartmill, Randi. 2000. "Occupational Sex Segregation in Global Perspective: Comparative Analyses of Industrialized and Less Developed Nations." Unpublished manuscript, Department of Sociology, University of Wisconsin–Madison.
- Chang, Mariko Lin. 2000. "The Evolution of Sex Segregation Regimes." *American Journal of Sociology* 105:1658–1701.
- Charles, Maria. 1992. "Cross-National Variation in Occupational Sex Segregation." *American Sociological Review* 57:483–502.
- Charles, Maria. 1998. "Structure, Culture, and Sex Segregation in Europe." *Research in Social Stratification and Mobility* 16:89–116.
- Charles, Maria, and David B. Grusky. 1995. "Models for Describing the Underlying Structure of Sex Segregation." *American Journal of Sociology* 100:931–71.
- Charles, Maria, and David B. Grusky. Forthcoming. *Sex Segregation in Comparative Perspective*. Stanford: Stanford University Press.
- Chodorow, Nancy. 1978. *The Reproduction of Mothering: Psychoanalysis and the Sociology of Gender*. Berkeley: University of California Press.
- Dodge, Norton. 1971. "Women in the Soviet Economy." Pages 207–23 in *The Professional Woman*, edited by Athena Theodore. Cambridge: Schenkman.
- Elias, Peter, and Margaret Birch. 1993. "Establishment of Community-Wide Occupational Statistics." Working paper, Institute for Employment Research, University of Warwick.
- . 1994. "Harmonising Occupational Information Across the European Union: Progress on the Labour Force Survey." Working paper, Institute for Employment Research, University of Warwick.
- Goode, William J. 1963. *World Revolution and Family Patterns*. New York: Free Press.
- Grusky, David B., and Maria Charles. 1998. "The Past, Present, and Future of Sex Segregation Methodology." *Demography* 35:497–504.
- Hartmann, Heidi I. 1976. "Capitalism, Patriarchy, and Job Segregation by Sex." *Signs* 1:137–69.
- Jacobs, Jerry A., and Suet T. Lim. 1992. "Trends in Occupational and Industrial Sex Segregation in 56 Countries, 1960–1980." *Work and Occupations* 19:450–86.
- . 1995. "Trends in Occupational and Industrial Sex Segregation in 56 Countries, 1960–1980." Pages 259–93 in *Gender Inequality at Work*, edited by Jerry A. Jacobs. Thousand Oaks: Sage Publications.
- Lapidus, Gail W. 1985. "The Soviet Union." Pages 13–32 in *Women Workers in Fifteen Countries*, edited by Jennie Farley. New York: ILR Press.
- Mincer, Jacob, and Solomon W. Polachek. 1974. "Family Investments in Human Capital: Earnings of Women." *Journal of Political Economy* 82:S76–S108.

- Parsons, Talcott A. 1970. "Equality and Inequality in Modern Society, or Social Stratification Revisited." Pages 13-72 in *Social Stratification: Research and Theory for the 1970s*, edited by Edward O. Lauman. Indianapolis: Bobbs-Merrill.
- Reskin, Barbara F., and Patricia A. Roos. 1990. *Job Queues, Gender Queues: Explaining Women's Inroads into Male Occupations*. Philadelphia: Temple University Press.
- Ruggie, Mary. 1984. *The State and Working Women: A Comparative Study of Britain and Sweden*. Princeton: Princeton University Press.
- Sanday, Peggy Reeves. 1981. *Female Power and Male Dominance: On the Origins of Sexual Inequality*. London: Cambridge University Press.
- Scott, Alison MacEwen. 1986. "Industrialization, Gender Segregation and Stratification Theory." Pages 154-89 in *Gender and Stratification*, edited by Rosemary Crompton and Michael Mann. Cambridge: Polity Press.
- Semyonov, Moshe, and Frank Jones. 1999. "Dimensions of Gender Occupational Differentiation in Segregation and Inequality: A Cross-National Analysis." *Social Indicators Research* 46:225-47.
- Stinchcombe, Arthur L. 1965. "Social Structure and Organizations." Pages 142-93 in *Handbook of Organizations*, edited by James G. March. Chicago: Rand McNally.
- Strober, Myra H. 1984. "Toward a General Theory of Occupational Sex Segregation: The Case of Public School Teaching." Pages 144-56 in *Sex Segregation in the Workplace*, edited by Barbara F. Reskin. Washington, D.C.: National Academy.
- Tilly, Louise A., and Joan W. Scott. 1978. *Women, Work, and Family*. New York: Holt, Rinehart, & Winston.
- Walby, Sylvia. 1986. *Patriarchy at Work*. Cambridge: Polity Press.
- Weeden, Kimberly, and Jesper Sørensen. Forthcoming. "Two-Dimensional Models of Sex Segregation: Industries and Occupations." In *Sex Segregation in Comparative Perspective*, edited by Maria Charles and David B. Grusky. Stanford: Stanford University Press.

WILLIAM T. BIELBY

The Structure and Process of Sex Segregation

My work seeks to understand the persistence of occupational segregation by sex and the sex gap in earnings. Neoclassical economists, of course, have an elegant, coherent theory of the sources of both occupational segregation by sex and earnings differentials: they come from the rational, utility-maximizing behavior of men and women within households and labor markets.

Sociologists view the situation differently. Indeed, depending on whom you ask, a sociol-

ogist might offer any of a number of explanations for sex differences in labor-market outcomes. Social psychologists would stress sex-role socialization. Feminist scholars would emphasize the "patriarchal" interests of male employers and workers. Marxists would tell a story about capitalists creating divisions in the work force in order to control labor and boost profits. Organizational theorists might talk about the unintended consequences of bureaucratic rules and procedures. Not surprisingly, sociologists from different camps often talk past one another.

However, sociologists are increasingly taking the work of neoclassical economists seri-

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