



Occupational status and organizations: Variation in occupational hierarchies across Swedish workplaces



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ABSTRACT

A foundational claim in social stratification research is that occupational hierarchies are largely invariant across societies, a phenomenon known as the Treiman constant. However, recent research in social stratification has focused on the role of local social spaces in generating inequalities, casting doubt on the validity of the idea of a universally invariant occupational hierarchy. In this paper, we focus on organizations as a local space in which occupational hierarchies may vary. We ask three questions: (1) do occupational hierarchies vary across workplaces, (2) why do occupational hierarchies vary across workplaces, and (3) what can explain why some occupations move up or down the occupational hierarchy in specific workplace contexts? Using novel administrative data from Sweden we measure and model the correlation between a workplace's occupational hierarchy and the national occupational hierarchy, finding substantial variation across workplaces in the matching of a given workplace's hierarchy to the national hierarchy. We then develop a set of contextual and relational variables at the organizational level to potentially explain this variation, as well as to explain which occupations move up or down the workplace hierarchy. This paper points toward an important and novel empirical finding – variation across workplaces in occupational hierarchies – both confirming the power of the Treiman constant while opening up avenues to explore deviations from it. It also reveals the need to develop theories than can explain this workplace-level variation.

1. Introduction

Occupations are often argued to form the backbone of social stratification systems, providing the basic structure of positions into which the resources of societies flow and forming a bedrock variable in the social sciences for determining the life chances of individuals. In the mid-twentieth century sociologists discovered that this backbone appeared invariant across societies. All known societies seem to rank-order occupations similarly, such that whether one is in the United States, Sweden, Russia, or Thailand individuals rank more highly engineers than garbage collectors, college professors than secretaries, and bankers than mechanics. This finding was solidified in the work of Donald Treiman (1977) into what has come to be known as the Treiman constant, and is one of the most reliable findings in the social sciences. Treiman conceptualized this as a prestige ranking, but the phenomenon is apparent in virtually every occupational scale sociologists have

devised such that we can speak more generally of an occupational hierarchy divorced from any particular underlying theoretical construct.

Despite its cross-societal empirical validity, recent developments in the local structuration of inequalities raise questions concerning the extent to which occupational hierarchies vary within local contexts. Social stratification research has increasingly moved towards analyzing the local spaces in which inequalities take particular shape such as local political economies and labor markets, neighborhoods, industries, and organizations and workplaces. Researchers attuned to such local variation have found that core stratification outcomes, such as income inequality (Tomaskovic-Devey, Hällsten, & Avent-Holt, 2015; Avent-Holt & Tomaskovic-Devey, 2012), social mobility (Chetty, Hendren, Kline, & Saez, 2014), and educational attainment (Sutton, 2017), vary across these localized social spaces.

In this paper we interrogate organizations¹ as a local space that

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¹ We will use the terms “organization” and “workplace” interchangeably throughout this article. Theoretically these are distinct, but all workplaces are organizations and the only organizations we discuss in this article are also workplaces leading us to use them synonymously.

potentially inflects and mutates occupational hierarchies. We treat organizations as the meat that fleshes out the occupational backbone, concretizing abstract occupational hierarchies into particular social relations within organizations. One can think of occupations as organized around similar tasks in the division of labor, while workplaces take individuals who can complete those tasks and organizes them into a specific labor process with concrete relations of authority, organizational routines, and job expectations. Because of this organizations are an important potential source of local variation in the occupational hierarchy.

Following the logic of one recently developed theory of the interconnections of organizations and stratification, Relational Inequality Theory, we ask three basic questions: (1) do occupational hierarchies vary across workplaces, (2) why do occupational hierarchies vary across workplaces, and (3) what can explain why some occupations move up or down the occupational hierarchy in specific workplace contexts? Answering such questions is now possible because of advances in data collection on organizations and the individuals employed in them. While organizations have been theorized in social stratification since the late 1970s (e.g. Baron & Bielby, 1980; Stolzenberg, 1978), until recently data on organizations have been rarer than that on individuals, and data linking the two have been extremely sparse. More importantly for us, complete data on the occupational structure at both the country level and the workplace level have been virtually non-existent until now. In this paper we utilize administrative data from Sweden, which enables us to link occupations to organizations and capture a complete profile of both the national and workplace level occupational hierarchies. These advances in data collection make it possible to begin exploring the questions outlined above, and more generally to answer questions about the interaction between individuals, occupations, and organizations over time.

While we find that the occupational hierarchy of Sweden, our case country, does to a large extent reflect the Treiman constant, occupational hierarchies also vary substantially across organizations within Sweden. Finding this variation in Sweden is important as its economy is moderately organized around occupations, somewhere between the liberal economies of the USA and UK and occupationally structured economies such as in Germany. We explore possible mechanisms producing this variation. This paper therefore bridges the comparative cross-national research on occupational status and hierarchies with the recent move toward local inequality generating processes within organizations.

2. The invariance of occupational hierarchies

One of the foundational claims of social stratification research is that the occupational hierarchy, or the rank-ordering of occupations, is fundamentally the same across all known societies. This social fact was initially identified in Inkeles and Rossi (1956), and subsequent research confirmed it across both space and time (see Hout & DiPrete, 2006). Donald Treiman (1977), however, provided the leg work in both documenting the extent of uniformity in occupational rankings across societies and in creating an international occupational scale for empirical use (the Standard International Occupational Prestige Scale [SIOPS]). In his defining book *Occupational Prestige in Comparative Perspective* Treiman culled data from 85 studies of 60 different societies and compared their occupational rankings. From there he identified an average correlation across countries of .79, with a standard deviation of .14. Thus, Treiman provided the most comprehensive analysis across the broadest range of time and space to provide robust evidence for the stable uniformity of occupational hierarchies, leading sociologists to refer to this as the Treiman constant. Since Treiman's landmark study there are no studies at the aggregate level that differ markedly from this constant (Hout & DiPrete, 2006).

However, while Treiman rooted this occupational invariance in his notion of occupational prestige, there is no need to conceptualize this as

a prestige scale. Treiman, and occupational prestige research more generally, has been heavily criticized for a weak notion of prestige both empirically and theoretically (Freeland & Hoey, 2018; Featherman & Hauser, 1976; Goldthorpe & Hope, 1972). And since Treiman's initial scale, much work has focused on comparing the empirical effectiveness of SIOPs to socioeconomic scales, generally tending to prefer socioeconomic scales over prestige scales (e.g. Hauser & Warren, 1997; Ganzeboom and Treiman 1996). However, because occupational scales are very highly correlated, typically above .8 (Hauser & Warren, 1997: Table 3; Ganzeboom and Treiman 1996: footnote 13; Nakao and Treiman 1994: Table 2; Featherman, Jones, and Hauser 1975: Table 3), regardless of how we conceptualize it the empirical phenomenon to examine is the existence of a roughly invariant occupational hierarchy. Therefore, in this paper we will refer to the Treiman constant as an empirical phenomenon documenting a roughly invariant occupational hierarchy, regardless of how this occupational hierarchy is measured or conceptualized. We are focused more on the broad notion of an occupational hierarchy than on the prestige scale and prestige argument of Treiman per se.

2.1. Variations in the occupational hierarchy?

While there is clear and substantial evidence of a uniform occupational hierarchy across societies, the extent of uniformity has been a source of much debate. Typically, scholars have debated how much variation there is in one of two locations: across individuals in a given society or across societies themselves. We are not directly concerned with how individuals rate occupations (e.g. Lynn & Ellerbach, 2017), except to the extent that they reflect how occupations get hierarchically organized within workplaces. Moreover, weaker correlations at the individual level has become well-recognized as partly a problem of aggregation, in which correlations of correlations average out individual differences meaning that aggregate correlations will always be higher (e.g. Zhou, 2005).² Of more interest to us are comparisons at the societal level. There we see that the initial reports of correlations above .9 among industrialized Western countries (e.g. Inkeles & Rossi, 1956) were reduced to Treiman's finding of .79 when including more non-Western countries. In particular, less developed countries and regions of countries correlate less well to the Treiman scale, and the now former socialist countries tended to rate manual occupations higher, indicating much more intersocietal variation.

In response to these findings some have argued that these variations are almost entirely random and/or nonconsequential. Treiman treats much of the observed intersocietal variation as aberrations from the uniform hierarchy that are either corrected as a country industrializes or trivial relative to the broader pattern of consensus. Our reading of the empirical evidence in this debate is that these variations are in fact important, but should be understood as variations on an underlying uniform occupational hierarchy (see also Wegener, 1992). That some patterned variation exists in how individuals and societies rank occupations is important, but it does not undermine the existence of a uniform hierarchy upon which deviations then emerge in concrete social contexts. The underlying occupational hierarchy is likely a product of the basic skill distinctions between occupations (le Grand & Tählin, 2013), and these distinctions then get roughly lodged into the minds of actors (Bates, Garbin, & Balkwell, 1986; Balkwell, Bates, & Garbin, 1980). This means that we are unlikely to observe, or produce, a society that completely reverses or undermines the occupational hierarchy specified by Treiman. But, it is also not an iron law that cannot vary. Even if the hierarchy is reasonably integrated into the collective consciousness of societies, there appears enough plasticity to generate substantively meaningful variations in the hierarchy in specific social

² This does not, however, answer the question of which level of correlations are most meaningful, but this need not concern us here.

contexts. As such, we think it is important for sociologists to continue to identify important sources of variability in the occupational hierarchy. We argue that workplaces should be understood as an important social context in which occupational hierarchies may be renegotiated.

3. Why expect workplace variation?

Recent theoretical and empirical developments in stratification research have pushed researchers to think about the social organization of inequality at localized social levels, moving from the typical social space of nation-states to local labor markets, local political economies, industries, neighborhoods, and organizations (Tomaskovic-Devey & Avent-Holt, 2019; Kristal, 2013; Hanley, 2010; Stainback, Tomaskovic-Devey, & Skaggs, 2010; Cohen & Huffman, 2003). Empirically, the key finding across these is that when we look for it, we see more and more variation in numerous inequality outcomes in these localized spaces, suggesting that the core processes that generate inequalities are happening there. The key theoretical point is that while there are likely generic inequality processes always at play in generating inequalities, these only take concrete form inside specific social spaces (e.g. Tomaskovic-Devey & Avent-Holt, 2019; Acker, 2006; Tilly, 1998).

Organizations are one such local social space to examine inequality dynamics. Already there is a body of research pointing towards the centrality of organizations in stratification processes, including job mobility, promotion dynamics, justice evaluations, and income inequality (see articles in Avent-Holt & Tomaskovic-Devey, 2017; see also Stainback et al., 2010). Relational Inequality Theory (RIT) is a theoretical model that places organizations at the center of stratification processes, arguing that social stratification is a generative process within organizations themselves (Avent-Holt & Tomaskovic-Devey, 2019; Tomaskovic-Devey & Avent-Holt, 2019; Avent-Holt & Tomaskovic-Devey, 2014). At its core RIT lodges standard notions of power and status inside organizations, where they are organized through specific social relationships and thus able to produce specific inequality regimes. In broad outlines, RIT argues that actors within organizations negotiate and struggle over resources produced, housed, or accumulated within organizations through a process of making claims on those resources. In the claims-making process some actors, either individuals or groups, within organizations articulate to others, especially those in powerful positions, why they are more deserving of some organizational resource than are other actors in the organization. Such claims tend to be connected to competence and productivity as they are filtered through status beliefs such that categorically distinct groups take on social statuses that enable them to claim differential resources. While income and jobs are the most common organizational resources, access to training, mentorship, and respect and dignity are other resources as well within the RIT framework. Two propositions from RIT will guide our analysis of occupational hierarchies.

The first proposition from RIT is that there is variation across organizations in the link between status characteristics and inequality outcomes (the organizational variation proposition). RIT expects that the extent, and in some cases direction, of inequality outcomes, the gender wage gap for example, will vary from one organization to another. The same will be true for racial and ethnic wage gaps, the link between education and income, and the extent and type of inequality across any status group. The evidence supporting this proposition is to date overwhelming (see Tomaskovic-Devey & Avent-Holt, 2019, Ch. 4).

Regarding occupational hierarchies, the organizational variation proposition suggests that while there may be an underlying uniform occupational hierarchy, we should expect some non-trivial variation in the rank-ordering of occupations across workplaces. Occupations that are lodged into organizations (i.e. jobs) should be thought of as organizational resources on which actors make claims. A large body of work within and outside of RIT suggests that occupations are social resources that actors attempt to monopolize (Avent-Holt & Tomaskovic-Devey, 2012; Tomaskovic-Devey & Skaggs, 2002; Weeden, 2002; Tomaskovic-

Devey, 1993; Reskin, 1988). However, actors do not just make claims on access to occupations, but also on the *social value* of occupations. The ethnographic literature on labor processes and divisions of labor is replete with examples of routine negotiation over organizational tasks and who is most valuable in the production process (Vallas, 2006, 2001; Hodson, 2001; Schatzman & Bucher, 1964). A notable example is Vallas' (2001) study of contestation between machinists and engineers in four pulp and paper mills undergoing technological restructuring. Engineers supplanted machinists as most valuable to the production process by defining themselves as having scientific expertise that the machinists lacked, moving machinists to the sidelines of production. Given this we propose the following hypothesis:

Hypothesis 1. Workplaces will vary substantially in the extent to which their own occupational hierarchy matches the national occupational hierarchy.

RIT also proposes that variation in the relationship between status characteristics and inequality outcomes is a product of the relational organization of the workplace that enables some actors to claim greater resources (income, prestige, etc.) than others (the claims-making proposition). The process that RIT theorizes involves some actors articulating why they are more deserving of some organizational resource than another. For a claim to actually generate an inequality in the distribution of those resources others in the organization must legitimate it by accepting the argument or reasoning from the claims-maker. Here power and status play a central role in legitimating claims within organizations, as others in the organization are more likely to accept as true and reasonable the articulations of powerful and higher status individuals in the organization.

As much of the relational organization that generates the legitimation of claims operates through categorical distinctions that are converted into status distinctions within organizations, it is the relational composition of status groups through which we can observe the relational power of actors to claim resources. One way to conceptualize and measure the power of status groups is through the relative sizes of actors within organizations, where the greater presence of higher status actors is an indication of their power. While the preponderance of higher status actors is not the only way to think about power, when they are more prevalent this should give them the capacity to both feel emboldened to make claims on resources and to collectively mobilize to secure those resources, and this is especially true when they monopolize core positions of an organization. And indeed inequalities in resources tend to grow larger when higher status actors dominate lower status actors across positions in an organization (Tomaskovic-Devey et al., 2015; Avent-Holt & Tomaskovic-Devey, 2012; 2010; Huffman, Cohen, & Pearlman, 2010; Tomaskovic-Devey, Avent-Holt, Zimmer, & Harding, 2009; Cohen & Huffman, 2007; Hultin & Szulkin, 2003, 1999).

This claims-making proposition has implications for the uniformity of the occupational hierarchy. The variation in occupational hierarchies should be a function of the relational organization of the workplace, as it is the relational organization of workplaces that generates the status distinctions that enable some actors to claim greater organizational resources. In particular, the status composition of organizations should enable some actors to claim greater status for the occupations they dominate, and thereby move their own occupation higher up the occupational hierarchy within the organization relative to the national hierarchy. The status of the occupation relative to other occupations is here conceptualized as a resource that is claimed, and a greater proportion of higher status actors within the organization will then lead to a greater deviation from the national hierarchy. Therefore we propose the following hypothesis:

Hypothesis 2. Workplaces dominated by higher status actors are more likely to deviate from the national occupational hierarchy than are workplaces dominated by lower status actors.

Hypothesis 2 is formulated at the workplace level, but using the

same logic we can formulate hypotheses at the occupation-level as well. Here we expect that the status composition of particular occupations within workplaces will lead it to deviate either higher or lower than its ranking in the national occupational hierarchy. In any given workplace, the more higher (lower) status actors are present in an occupation within a workplace relative to the occupation in the national occupational hierarchy, the higher (lower) the occupation will be ranked in the workplace hierarchy. This has the added empirical advantage of observing which occupations, in terms of their status composition, are moving up in a workplace and which are moving down when there is a workplace reordering of the occupational hierarchy. Therefore we propose the following hypothesis:

Hypothesis 3. Occupations with more higher status actors within a given workplace than in the national occupational hierarchy are more likely to deviate upward from their ranking in the national occupational hierarchy.

This process should further be bolstered by the presence of similar higher status actors within a workplace. When an occupation is increasingly dominated by higher status actors and those actors dominate a workplace, their capacity to move their occupation up the occupational hierarchy should increase as well. This gets at the kind of relational power that emerges from building status-based coalitions within the workplace, which can provide legitimacy to the claims of actors. Therefore, we propose the following hypothesis.

Hypothesis 4. Occupations with more higher status actors within a given workplace than in the national hierarchy that are in workplaces also dominated by those higher status actors will be more likely to deviate upward from their ranking in the national occupational hierarchy.

4. Sweden and occupational hierarchies

Our argument is a general one in which we expect these workplace level deviations to occur in all national contexts. However, we also expect these deviations to be more pronounced in some national contexts and less pronounced in others. Some countries have labor market policies, educational policies, wage bargaining regimes, and other political economic institutions that will incentivize or otherwise lead workplaces to match their occupational hierarchies to the national hierarchy. For example, Germany has vocationally-centered labor market and educational institutions that engender a strong occupational culture at the national level. Students are tracked early on into occupational destinations and occupational distinctions are deeply embedded in labor market policies, and so occupational distinctions become solidified culturally within Germany. This is in contrast to more liberal countries such as the US and UK, where educational training is more general and career trajectories less tied to particular occupations. In such contexts, work cultures become less centered on occupational distinctions, and occupations become less central culturally and economically. An even sharper contrast is a country like Japan, whose political economy is organized around firms, and careers are wedded to particular firms rather than particular occupations.

As a test case for the role of workplace dynamics in occupational hierarchies, Sweden works well because it is situated somewhere between the occupationally-centered political economies of places like Germany and the weakly occupationalized political economies of the liberal countries (for a similar argument, but related to mobility, see DiPrete, 2002 and DiPrete, De Graaf, Luijckx, Tählin, & Blossfeld, 1997). Like Germany it is a highly formalized economy with extensive union coverage and collective bargaining, as well as centrally coordinated wages. Thus, the linking of occupations and income (which below we will develop as our measure of occupational hierarchies) produces a strong mechanism of national uniformity in occupational rewards.

However, more in line with the liberal economies of the US and UK,

vocational education and the skill structure is oriented towards the development of general rather than specific skills. In the Swedish context this is accomplished in order to map onto the political economic model of continual industrial restructuring. This in particular produces a relatively weak national occupational culture, unlike the vocationally-organized labor markets of countries such as Germany. In this sense then we may expect more variation at the local level than in a country with a stronger general orientation towards occupation-specific cultures and skills. Thus, if we could imagine a scale of how occupationally centered an economy is, Sweden likely falls somewhere in the middle. As such we argue that it provides a reasonable, perhaps conservative, test case for workplace-level variations in occupational hierarchies.

5. Data and methods

We utilize the Swedish Wage Structure Statistics from 2008, 2010, and 2012. These are administrative data, collected for the purposes of collective bargaining. They contain complete records of detailed occupation and monthly wages clustered within workplaces for all employees in both the public sector and large private firms (500+ employees), as well as in a firm-level cluster sample of small and mid-size private firms. The monthly wages are adjusted to reflect 100 percent work time, and are the best indicator available to capture remunerations. To these data we match information on demographic and educational characteristics of employees from additional population wide register data sources (for example national registrations and education registers).

5.1. Measuring occupational hierarchy

As our goal is to measure the extent of variation across workplaces in the occupational hierarchy, we need measures of occupational rankings both at the country-level and within workplaces. Given the global uniformity of occupational hierarchies, the country-level hierarchy is a reasonable empirical approximation of the Treiman constant. We utilize a measure of occupational rankings that approximates most major hierarchical occupational classification schemes.³ Using 113 3-digit ISCO-88 codes we calculate the average wages of occupational incumbents for each occupation (i.e., one of the core components of Duncan's SEI). We residualize wages on gender, immigration status, and age to remove any effect of individual demographic characteristics on wages and thereby isolate the relationship between occupations and wages. We then rank occupations by their average wage first nationally and then within each workplace so that we can measure the relationship between the workplace and the national hierarchy. We standardize both ranks to the workplace division of labor – i.e., the particular occupations in a given workplace – to reflect the cumulative distribution function within the workplace and net out the effects of workplace size.

Our occupational scaling procedure is based on the average income of the occupation. It is therefore one component of Duncan's SEI, which was originally devised to approximate prestige rankings when they were not empirically available (Duncan, 1961). Hauser and Warren (1997) argued that using the average education level of an occupation is preferred over the average income level, in part because it is more strongly associated with prestige scalings but more centrally for them because it better explains the mobility process. However, scaling based on occupational education makes far more sense for mobility research than for determinations of the social valuation of an occupation at either the country or workplace level. Income is a direct measure of how an occupation is valued, while education levels better capture the process of gaining access to a particular occupation. In fact, it makes little sense to measure the dynamic social valuation of occupations within workplaces through educational credentials as organizational

³ Our measure correlates .78 with SIOPS and .82 with ISEI.

actors who evaluate occupational incumbents, whether they are employers or co-workers, have no capacity to affect the educational levels of occupational incumbents. They do, however, have the ability to influence the wage rates attached to occupations. As we are concerned with the social valuation of an occupation, we employ an occupation-income scale to determine the occupational hierarchy.

From the workplace and national ranks, we produce two outcome variables: the correlation between the workplace and national ranks specific to each workplace (to be used in workplace level analyses), and the deviation in ranks between workplace and national ranks (which we use in our occupation level analyses). Unless otherwise noted we only include workplaces with at least 3 employees and at least 3 occupations per year in our analyses. Our overall data structure is workplace by occupation (by year).⁴

5.2. Measuring status group composition

While a core part of our analysis involves correlating the national and workplace rankings to assess the degree of variability in correlations (addressing hypothesis 1), we will also pursue a modeling strategy to explain what leads some organizations to deviate from the national hierarchy (addressing hypothesis 2) and some occupations to deviate from their position in that hierarchy (addressing hypotheses 3–4). At the center of the theoretical argument underlying hypotheses 2–4 is the claim that the status relationships within workplaces shape the capacity of actors to alter the relative positioning of occupations within their local workplace. Thus, we need a set of variables that tap into who is dominant within workplaces and can plausibly redefine their occupation as more valuable or define other's occupations as less valuable. To do this we start with a set of social statuses that we can observe: gender, nationality, age, education, and full-time employment, each operationalized as dichotomous variables (see descriptions in Table 1). We then measure the proportion of each status group in the overall workplace and at the occupational level. For the workplace compositions, each status group is measured by their proportion in the workplace, such that zero represents no workers with that status characteristic in the workplace and 1 represents a workplace with only workers with that status characteristic. In doing this we are analyzing the extent of overall power that a status group has within the workplace. To measure the effect of status group characteristics on particular occupations we also measure each status group's composition in a given occupation at the workplace level relative to their proportion in the occupation at the national level. This better captures the power of specific status groups to move occupations up or down the workplace hierarchy, the core mechanism in RIT for creating deviations from the national occupational hierarchy. Table 1 provides descriptive statistics and variable definitions for the variables used in our models.

5.3. Measuring organizational characteristics

We also expect that basic contextual features of organizations will shape the extent to which a workplace deviates from the national hierarchy, including workplace size, number of occupations, the size of the largest occupation, sector, industry, and workplace wage and inequality levels. These characteristics are standard variables in organizational analyses, and tend to have predictable effects on organizational outcomes. Size is measured as the number of employees, and is transformed to its natural log. The number of occupations is a simple count of the number of occupations in the workplace, which we include as

⁴ Pooling the data across years, i.e. aggregating to the workplace level, produces the same substantive results. However, when we compute the intraclass correlation of the correlations, it shows that there is as much within establishment variation over time as there is between establishment variation. We see little reason to remove this temporal variation.

Table 1
Descriptive Statistics for Key Workplace and Occupation × Workplace Characteristics.

	mean	sd
Workplace level (by year)		
Workplace rank correlation	0.734	(0.325)
Proportion male ^a	0.381	(0.311)
Proportion native ^{a,b}	0.958	(0.082)
Proportion (age > 50) ^a	0.363	(0.187)
Proportion with tertiary education ^a	0.297	(0.254)
Proportion fulltime ^a	0.725	(0.229)
Size of largest occupation ^c	0.533	(0.199)
ln Size ^a	3.206	(1.109)
Wage level (logs) ^a	10.082	(0.182)
Wage SD (logs) ^a	0.198	(0.093)
Number of occupations ^d	6.739	(4.816)
Occupation × Workplace level (by year)		
Rank difference local vs. national	0.000	(0.244)
P male deviation	-0.015	(0.319)
P native deviation	0.012	(0.139)
P (age > 50) deviation	0.055	(0.382)
P tertiary education deviation	-0.022	(0.301)
P fulltime deviation	-0.010	(0.321)
ln largest occupation	0.171	(0.377)

Note: data is workplace × year cells (3 years: 2008, 2010 and 2012). Industry dummies displayed in Appendix Tables A1.

^a These are centered at the grand mean in regression analysis to aid interpretation of interactions.

^b measured as 1 - P non-western immigrants.

^c as share of total.

^d min = 3, max = 50.

dummies. Size of the largest occupation is measured as the share of employees in the largest of occupation within the workplace, and it is included to capture occupational diversity in the workplace. Sector and industry are measured as dummy variables for four sectors - state, municipal government, county government, and private sector - and twenty-three industries. Finally, high wage workplaces are measured as workplaces where the mean wage is above the median wage nationally and high inequality workplaces are measured as workplaces where the standard deviation of wages is higher than the national standard deviation. We treat these as controls for testing the relational hypotheses.

5.4. Analytic strategy

Our analytical strategy for examining workplace variation in occupational hierarchies begins by measuring the correlation between the workplace occupational rank and the national occupational rank, which tests hypothesis 1 on organizational variation. We thus create a workplace-specific measure of the correlation of the national occupation wage rank and the local workplace rank, standardized to the number of occupations in the workplace. The closer the average of these correlations are to 1, the less unique workplaces are and the more they simply reflect the underlying uniform occupational ranking. We also examine the standard deviation in the correlations to assess just how much variability there is across workplaces around the average correlation. Standard deviations closer to zero suggest little variation, while larger deviations imply more substantial variation.

Obviously an average correlation of 1 with a zero standard deviation is not realistic as a benchmark against which to assess the organizational variation hypothesis. Even if there was complete uniformity, measurement error would prevent such a statistical outcome. Our goal then is to demonstrate that the deviations from uniformity that we observe are not random or driven by measurement error through a series of robustness checks and simulations. However, we will also compare our interorganization correlation to Treiman's intercountry correlation of .79 with a standard deviation of .14, recognizing this was developed in the context of assessing individual attitudes rather than

Table 2
Variations in occupational ranking correlations across workplace types.

	Mean correlation	SD correlation	N	%
All	0.73	0.32	104,013	100
Size				
3-25	0.70	0.39	56,081	53.9
25-50	0.76	0.26	21,312	20.5
50-99	0.77	0.22	15,760	15.2
100-199	0.77	0.19	6,664	6.4
200+	0.77	0.15	4,196	4
No. Occ.				
3-5	0.71	0.40	57,941	55.7
6-10	0.76	0.22	28,988	27.9
11-15	0.78	0.15	10,868	10.4
15+	0.78	0.12	6,216	6
High wage WP	0.74	0.31	51,963	50
Low wage WP	0.73	0.34	52,050	50
High inequality WP	0.77	0.27	51,508	49.5
Low inequality WP	0.70	0.37	52,505	50.5
Blue collar WP	0.70	0.36	38,117	37.9
White collar WP	0.75	0.30	62,510	62.1
Sector				
State	0.73	0.29	6,269	6
Municipality	0.87	0.16	5,235	5
County	0.75	0.31	43,251	41.6
Private	0.70	0.35	49,258	47.4
Industry				
Farming, forestry, fishing	0.62	0.47	614	0.6
Extraction	0.65	0.34	230	0.2
Manufacturing	0.71	0.30	7,523	7.2
Core supplies (energy, water, radio, deposit)	0.68	0.36	2,834	2.7
Construction	0.66	0.38	3,277	3.2
Transport	0.74	0.33	2,933	2.8
Consumer services and repairs	0.63	0.40	1,117	1.1
Retail sales	0.69	0.41	3,474	3.3
Wholesale	0.68	0.35	2,271	2.2
Sales of valuables and durables	0.57	0.43	2,234	2.1
Hotels and restaurants	0.71	0.33	1,104	1.1
Personal services	0.53	0.47	203	0.2
Real estate	0.78	0.25	1,546	1.5
Legal and accounting	0.76	0.31	1,529	1.5
Financial services	0.63	0.42	1,970	1.9
Firm services	0.68	0.37	6,004	5.8
Other services	0.64	0.41	3,837	3.7
Public administration	0.76	0.25	7,678	7.4
Education	0.78	0.28	27,820	26.7
Academia and research	0.67	0.32	1,330	1.3
Health	0.77	0.31	18,134	17.4
NGOs	0.78	0.28	5,474	5.3
Media	0.69	0.34	877	0.8

employment remunerations.

If we find evidence of substantial variation, we then move to a series of robustness checks to see if the variation is isolated to particular types of workplaces. Here we stratify the sample by employment size, number of occupations, blue-collar and white collar occupations, average income levels, income inequality levels, sector, and industry. If the variation is not isolated to particular workplaces then we can be confident that workplaces are generating occupational hierarchies that deviate in meaningful ways from the national hierarchy.

Upon finding substantial workplace variation in occupational hierarchies, we next analyze the sources of workplace-level deviations from the national occupational hierarchy in a multivariate regression framework using two distinctive modeling strategies. First, we develop a model to predict what organizational factors and processes explain variation in the correlation between workplace level and national level occupational hierarchies. In this model our outcome variable is the correlation between the national occupational hierarchy and the workplace occupational hierarchy for each workplace, and this is modeled using status group composition at the workplace level and the array of organizational characteristics. This model captures the extent

Table 3
Predictors of occupational rank correlations.

P male	-0.115 ^{**}
P native	0.041 [*]
P (age > 50)	0.114 ^{***}
P tertiary education	0.023 ^{***}
P fulltime	0.045 ^{***}
Size of largest occupation	0.016
ln WP Size	0.051 ^{***}
High wage WP	0.006
High inequality WP	0.107 ^{***}
Sector: state	(ref.)
Sector: municipality	0.075 ^{***}
Sector: county	0.009
Sector: private	0.019 ^{**}
Constant	0.436 ^{***}
Year	Yes
Industry	Yes
No. occupations	Yes
Observations	104,041
Workplaces	47,548
Adjusted R2	0.076

Data are workplace × year cells and include year and industry fixed effects.

^{*} p < 0.05.
^{**} p < 0.01
^{***} p < 0.001.

to which the overall power of a given status group within a workplace can act to reorganize the occupational status hierarchy.

In a second model, we focus on the deviation of specific occupations in a workplace from their rank in the national hierarchy. Here we model the deviation of each occupation in a workplace from its position in the national occupational hierarchy using the status group compositions in that occupation relative to its status group composition in the occupation nationally. Our outcome variable for this model is the occupational rank within the workplace minus the occupational rank in the national hierarchy ($OR_{work} - OR_{nat}$). Positive values thus mean a higher occupational rank in the workplace than in the national hierarchy, and negative values mean a lower rank in the workplace. Our independent variables then are the status group composition of the occupation in the specific workplace minus the status group composition in the national hierarchy ($PS_{occ,work} - PS_{occ,nat}$). Though we have anchored our analysis in RIT, we still treat these models in a largely exploratory framework, as there is less clear theoretical development yet to explain the novel empirical phenomenon.⁵

⁵ One may theorize at this point, as did an anonymous reviewer, that supply and demand factors central to the human capital framework may also play a role here. In particular, organizations facing limited supply into particular occupations will be forced to pay them higher wages, and some organizations may adopt strategies to pay higher wages in some occupations to attract the best talent. We think this is plausible. However, we do not have very good indicators of supply and demand so cannot really assess this claim very convincingly. In particular, it would be ideal to measure both specialized training and the local supply of labor with such specialized training. We have no measure of specialized training, and only weak proxies for the local labor supply. We experimented with four measures of local labor supply. While they did not effect our core coefficients when we enter them into our main models, they also do not work as expected in baseline models (results available upon request). More work with better measures is needed to fully assess this explanation, though for now we are confident in our models. We thank an anonymous reviewer for suggesting this line of investigation.

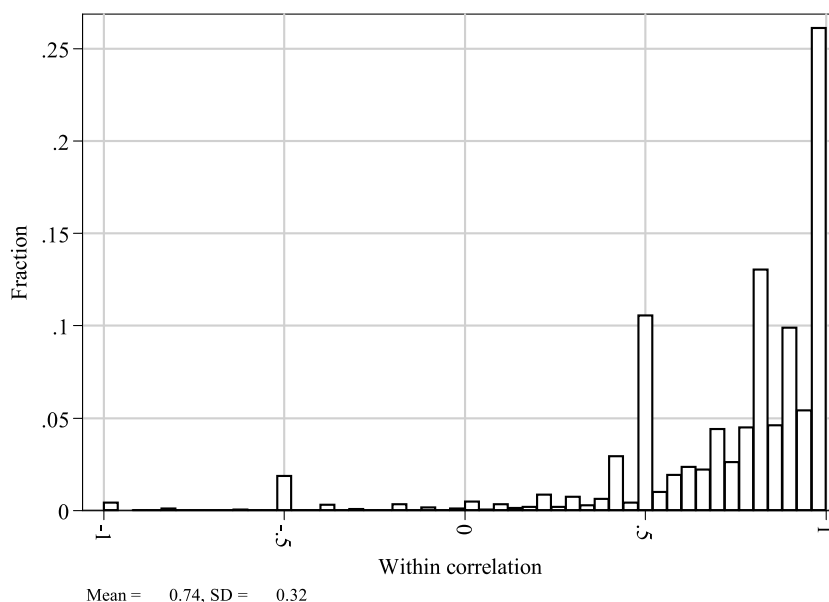


Fig. 1. The distribution of occupational ranking correlations.
Note: data is workplace \times year cells (3 years: 2008, 2010 and 2012).

6. Results

6.1. Occupational hierarchy correlations

We begin by analyzing the correlations between workplace occupational hierarchies and the national occupational hierarchy, testing hypothesis 1. Fig. 1 shows the full distribution of correlations between each workplace (in each respective year) and the national occupational hierarchy. The mean correlation between workplace hierarchies and the national hierarchy is .74. For one quarter of the workplaces the correlations are at unity, where the local and national hierarchies map perfectly, and for the remaining three quarters of the workplaces we find a strong concentration of values above .5. This suggests that the national hierarchy exists independently of workplaces and exerts a strong role in shaping the organization of local occupational hierarchies within workplaces. That said there is noteworthy variation across workplaces in the rank-order of occupations. Despite a mean that approaches the Treiman constant for countries of .79, our data for workplaces contain much greater variation with a standard deviation of .32 (compared to Treiman's intercountry standard deviation of .14). Even more strikingly, our data also contain a few cases where the correlation is negative, i.e., where a bottom ranking occupation ends up on the top of the workplace hierarchy. Taking all of this together, despite a reasonably influential national occupational hierarchy, there is quite a bit of variation across workplaces in the rank ordering of occupations providing clear support for hypothesis 1.

To assess if it is just in particular types of organizations where we see such variation Table 2 assesses how the correlations vary across several organizational dimensions. Largely, the pattern found above remains for each dimension: strong conformity to the national hierarchy but with substantial variation across workplaces. Most of the correlations approximate the average correlation of .74 with standard deviations around .3 or higher. This suggests to us that the deviations are not driven by some subset of organizations that do not conform to the national occupational hierarchy.

There are, however, a few organizational characteristics that lead workplaces to more closely approximate the national hierarchy, most notably those in the municipal sector, high inequality workplaces, organizations with more employees, and organizations with more occupations. In Fig. 2, we further scrutinize two of these dimensions that are particularly prominent in work on organizational stratification:

workplace size and the number of occupations present in the workplace. The correlations grow stronger the larger the workplace is, and with an increasing number of occupations present. This suggests that there is more convergence to the national hierarchy for larger workplaces which have both more employees and more occupations. Hence, we will find the most room for deviations from the national hierarchy among smaller workplaces. In a statistical sense this is most likely to be the case simply because in smaller workplaces the occupational configuration is subject to greater random influences. However, in a substantive sense, smaller organizations are also less bureaucratic which gives leeway for decisions that negate the national hierarchy. For example, smaller workplaces can be more dependent on specific employees, which may force them to turn the hierarchy on its head in some cases and create space for the relational status processes central to RIT.⁶

Given this, we interpret these patterns of average correlations as confirming hypothesis 1 that there is substantial variation across workplaces in their approximation of the national occupational hierarchy. While there is a reasonably high mean correlation that approaches the Treiman constant, there is also important variation across workplaces in the occupational hierarchy that needs to be explained. In particular, there appears to be more variation among workplaces than there is among countries given the different standard deviations here relative to Treiman. In the next section we develop models that attempt to explain this variation.

⁶ As a sensitivity analysis, we simulated correlations between the workplace and national ranks by assigning specific individuals, with their occupations and wages, randomly to workplaces in various ways. These are discussed in Appendix A, and largely show that our findings are not very sensitive to the matching of specific individuals to specific organizations. There is one exception. If we keep each workplace occupational distribution intact, and randomly assign individuals and their wages via matching occupations, the simulated correlation is somewhat weaker. This suggests that the occupational hierarchies we observe are not entirely structural, but to some degree dependent on those individuals that inhabit workplaces (this is despite our residualization strategy discussed above). However, even in this case, the lion's share of the correlation remains.

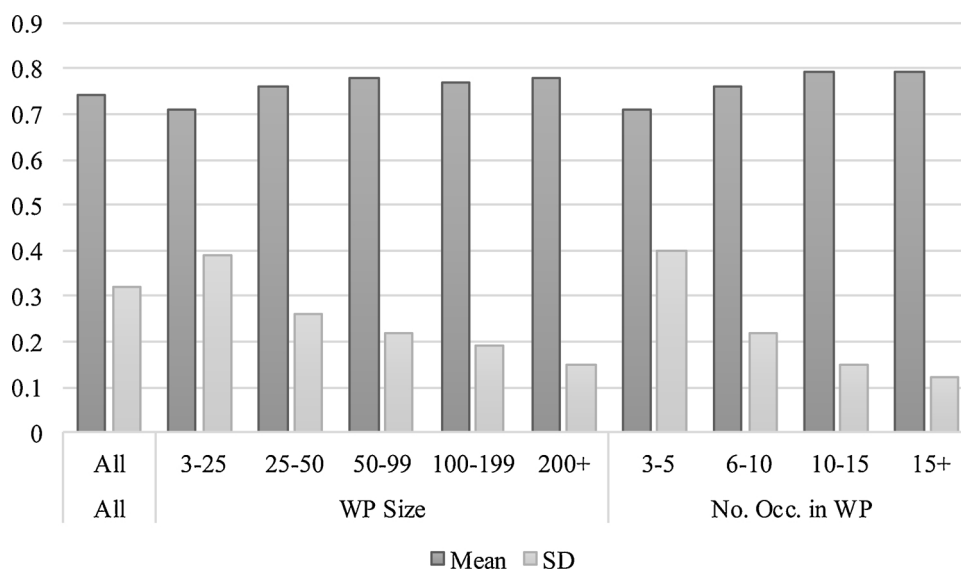


Fig. 2. Variations of occupational ranking correlations across structural dimensions.

6.2. Explaining Variation in Occupational Hierarchies

In Table 3 we model the influence of organizational variables on the correlation between the national and workplace occupational hierarchies (hypothesis 2). In particular, we focus on the status composition variables as these provide one test of the relational claims-making hypothesis. In this model we find that status group composition is associated with deviations from the national hierarchy, though not always in consistent ways. In fact, while all status group compositions are associated with changes in the occupational hierarchy, only gender composition acts as we theorized. There, men appear to bid up their occupational status when they dominate in the workplace, reducing the correlation to the national hierarchy by .12 when their proportion of the workplace goes from zero to one. These are of course extreme differences rarely observed, and if we compare a workplace with 25 percent men and 75 percent men, with a difference of 50 percent, this would translate into a difference in the correlation of .06 (.12 * 0.5). But this negative relationship does not hold for any other high status group. In fact, workplaces where native workers, older workers, more educated workers, and full-time workers are each more prevalent are workplaces whose occupational hierarchies more closely conform to the national occupational hierarchy, with an increase in the correlation to the national hierarchy ranging from .02 to .12. In this sense, we find relatively weak support for hypothesis 2 that dominant status groups within workplaces will bid up their occupational positions.⁷

Examining the organizational characteristics, size is strongly positively related to the occupational rank correlation exactly as the descriptive analyses suggested. Since size is in log form, doubling the workplace size is associated with an increase of the correlation of .05. As well, across all models both high wage workplaces and high inequality workplaces more closely approximate the national hierarchy. Finally, municipal organizations are consistently more like the national hierarchy than are other sectors.

Next we pursue an occupation-centered analysis that looks at the characteristics of occupations within workplaces to see when and why they deviate from their position in the national occupational structure. Table 4 models the deviation of an occupation's rank within a

⁷ We reran these models with higher thresholds for the number of occupations (5, 10, and 15 occupations, respectively). Substantive results remained the same, though coefficients tended to be somewhat smaller with higher thresholds.

Table 4 Occupations relative rank within workplaces.

	(1)	(2)	(3) ^a
P male deviation	-0.107* **	-0.129* **	-0.107* **
P native deviation	-0.038* **	0.020***	0.049***
P (age > 50) deviation	0.006***	0.005***	-0.015* **
P tertiary education deviation	0.132***	0.137***	0.141***
P fulltime deviation	0.061***	0.074***	0.104***
In largest occupation	0.025***	0.023***	0.054***
P male deviation # P male in WP ^b		0.047***	0.070***
P native deviation # P native in WP ^b		0.642***	0.389***
P (age > 50) deviation # P (age > 50) in WP ^b		0.047***	0.147***
P tertiary educ. deviation # P tertiary educ. in WP ^b		-0.105* **	-0.085* **
P fulltime deviation # P fulltime in WP ^b		0.178***	0.245***
Constant	-0.002* **	-0.010* **	-0.010* **
Observations	725,817	725,817	67,589
Workplaces	107,824	107,824	2,871

Note: data are workplace × occupation × year cells. The outcome is an occupation's rank within the workplace minus the occupation's national rank (adjusted to have same scale within workplace). The deviations measure the proportion of the characteristic within the workplace × occupation minus that of the national occupation only, i.e., positive values refer to excess proportions within the workplace × occupation. All models contain workplace fixed effects.

^a Restricted to workplaces with > 15 occupations and > 200 employees.

^b grand mean centered.

*** p < 0.001, ** p < 0.01, * p < 0.05.

workplace from its rank in the national hierarchy (OR_{work}-OR_{nat}), regressing this outcome on deviations of status compositions at the workplace level (PS_{occ,work}-PS_{occ,nat}). In model 1 we focus on the relationship between various status group composition deviations and occupational rank deviations (hypothesis 3), while in model 2 we interact this with the status group's composition in the workplace as a whole (hypothesis 4). Model 1 shows that the more men there are in an occupation within a workplace relative to in the national hierarchy, the lower that occupation's rank within the workplace relative to the national hierarchy. Given the coefficient of -.107 and a standard deviation of .32 (see Table 1), one interpretation is that a one standard deviation increase in the proportion males in a workplace relative to the national

proportion will lead to a rank position that is about 3 percentiles lower ($.32 \times .107 = .034$). Interestingly, the same pattern holds for native workers, though the coefficient indicates fairly negligible results. These both of course work opposite our prediction in hypothesis 3. Support for hypothesis 3, however, does emerge with respect to age, education, and fulltime status, though the age association is so small it approximates a null relationship. There, having more college educated or fulltime workers in an occupation within a workplace relative to in the national hierarchy moves that occupation above its position in the national hierarchy. For tertiary education the effect size (given its standard deviation) is about equivalent to the gender effect size above (a 4 percentile increase for a one standard deviation increase; $.132 \times .301 = .040$), while it is about half that for full-time status ($.061 \times .321 = .020$).

Model 2 further interacts these occupational compositions with the relevant workplace compositions to see if the presence of higher status actors within an occupation is buttressed by the presence of higher status actors in the workplace overall (hypothesis 4). In general, the interactions operate as expected (with the exception of tertiary education), though in all cases we see these as producing substantively marginal changes to the main effect. For example, in workplaces with the average share of males and females, the negative association between proportion males in the occupation and its rank is represented by the main effect of $-.129$. This declines when the proportion of males increases, and increases when female increases, but the difference is very small. Increasing the proportion of males in a workplace by one standard deviation, the negative association becomes $-.114$ ($-.129 + .047 \times .31$), or approximately the same as the main effect. While for proportion native and proportion over age 50 the interactions do shift the slope from positive to negative, again their substantive effect on workplace and national occupation rank differences are negligible.

In all cases then the interactions shift the main effect by well under a full percentile for a one standard deviation change in the workplace status composition, meaning that in the average workplace the workplace composition of status groups does not move an occupation that deviates from the national hierarchy in its status groups composition by even one full position in the occupational hierarchy. Of course, this means that in some workplaces substantive changes to occupation ranks are likely to be occurring, but these do not seem to occur in any way that we have systematically identified.

Model 3 further restricts this analysis to large workplaces, those with more than 15 occupations and more than 200 employees. Doing so leads to the same substantive conclusions from model 2. If anything most of the coefficients increase in size, though generally marginally, by focusing on larger organizations.

The overall conclusion from these analyses is that relative shifts in the proportion male, proportion with tertiary education and proportion fulltime within an occupation within a workplace can produce positive or negative differences in ranks of up to 3 percentiles for a one standard deviation, and that this is little altered by the overall workplace composition. The more males in the occupation in the workplace the lower the local rank, and vice versa for tertiary educated workers and fulltime workers.⁸ This identifies substantive changes to the occupational hierarchy at the workplace level in ways that both support (tertiary education and full-time employment status) and contradict (gender) the hypotheses derived from RIT.

7. Discussion and conclusion

Building on recent work in social stratification that analyzes the

⁸ In subsequent models not shown we checked for interactions between status group deviations and other workplace characteristics such as size, level of wages, and inequality of wages. These interactions do not substantively alter the basic associations in any meaningful ways.

constitution of inequality within organizations (and local social spaces more generally), this paper pushes forward the intersection of organizations and the occupational structure in understanding social stratification. We have offered compelling empirical evidence for a novel social phenomenon: the existence of workplace variation in what are typically understood as societally invariant occupational hierarchies. Undoubtedly, there is an overarching occupational hierarchy that is dominant across time and space, and it is one that is likely rooted in skill differences between occupations. However, this aggregate occupational rank-order appears to mutate within at least some organizational contexts into a distinctive workplace-specific occupational hierarchy. The large standard deviation among workplaces in the Swedish economy is fairly strong evidence of this. As well, we see that in some workplaces occupations moving up or down the hierarchy leads to negative correlations with the national ranking.

That this variation exists is perhaps the most central finding of this paper. The question that this finding then prompts is what is organizing the variation? We have drawn upon RIT, which centers stratification processes within workplaces, to attempt to explain such deviations. Using two modeling strategies, we find some, though by no means conclusive or even consistent, support of RIT's predictions. In the workplace analysis having more men in a workplace appears to lead to a greater deviation from the national hierarchy, though this is the only status category that does this. In fact, the dominance of native workers, older workers, highly educated workers, or full-time workers in a workplace actually leads to a greater conformity to the national hierarchy, completely contradicting expectations from RIT.

Turning to the occupational analysis, this modeling strategy provides instead a picture of what moves occupations up or down the occupational hierarchy within a workplace. Tertiary education and full-time worker status operate in a fairly straightforward way. Occupations with more workers with tertiary degrees and more full-time workers than in the national hierarchy tend to move up the workplace hierarchy. We find that a one standard deviation difference in the proportion of tertiary educated workers in the workplace relative to Sweden as a whole was associated with a 4 percentile difference in that occupation's rank. To get a sense of the magnitude of this effect we can imagine one workplace with 25 occupations where the difference would move workers in that occupation up or down the workplace hierarchy by 1 occupational rank position. Alternatively, we could imagine a set of workplaces with 8 occupations in each of them. Among them, we would find that a one standard deviation increase in the proportion of tertiary educated workers in that occupation shifts that occupation upward by 1 rank position in every third workplace. The effects for full-time status are notably lower, moving less than half as much for a one standard deviation. Hence, the compositional effects we observe are small. Even more so, age and nativity as status group characteristics have negligible effects, doing very little to move an occupation up or down the workplace hierarchy. Gender on the other hand works counterintuitively in our occupational models. Occupations with more men in them at the workplace level than in Sweden as a whole move down the workplace's occupational hierarchy, with an effect size similar to that of tertiary education. In no cases are these main effects substantially moderated by the dominance of relevant status groups within the workplace.

Our interpretation of these findings is centered on the logic of RIT, which places claims-making as the central mechanism through which workplace inequalities develop. In Sweden when certain status characteristics, namely education and full-time employment status, come to dominate an occupation within a workplace those workers are able to bid up the status of their occupation therein. That said, this is not true of gender, nativity, or age, at least within the Swedish political economic context. Gender in fact operates in such a way that women appear to be the ones bidding themselves up the occupational hierarchy as they come to dominate occupations within a workplace.

The different directions for some covariates in our workplace- vs.

occupation-focused analyses highlights how these two are not nested but instead reflect different processes. Comparing across our modeling strategies, gender stands out as the most consistently powerful force in reshaping occupational hierarchies. Education is similarly powerful for describing the rank of specific occupations, but not for describing the strength of the national occupational structure within the workplace. Age is the opposite in that it is a stronger predictor of the workplace structure, but appears more negligible for how specific occupations fare. However, the conundrum is that gender works differently in each of the analyses. More men present in workplaces leads to greater deviation from the national hierarchy, but the occupational analysis does not lead us to think this is happening by men bidding their occupational status. In fact, women appear to be the ones bidding themselves up the occupational hierarchy as they come to dominate occupations within a workplace. This is perplexing, but again suggests different processes at work at the workplace and occupational levels.

While these coefficients, even the main effects, suggest fairly limited movement in the occupational hierarchy, it should be recognized that these are average effects. This means that there may be organizational contexts where much more movement is going on, but we have not identified these contexts with the data at hand. Perhaps it is fairly idiosyncratic workplaces in which such substantial movement occurs, or perhaps we have simply not identified the right organizational dimensions on which this turns. Future research should investigate this question further.

We are left then to encourage other researchers to further theorize and then empirically examine what might be producing these workplace deviations from the national occupational hierarchy. One important line of inquiry would be to assess the role of market forces in shaping how organizations value particular occupations, thereby re-ordering workplace occupational hierarchies. We attempted this in supplementary analysis but with inadequate data (see footnote 5). With better measures one could specify how local labor supply pools may shape these organizational dynamics. Another line of inquiry would be to examine how occupational hierarchies are shaped by other local contexts such as neighborhoods or industry-level processes, perhaps connecting these to workplace level dynamics. It is important to keep in mind the exploratory nature of this work. This is a novel finding in that workplaces vary more or less from the national occupational hierarchy discovered by Treiman and others in the mid-twentieth century. More exploratory research is likely the best strategy for now, and both qualitative and quantitative analyses will be fruitful. Developing case studies of workplaces that have substantially distinctive occupational hierarchies would be useful to tease out what may make these workplaces distinctive. From this researchers could then generalize up and develop theory and variables likely to explain variation across workplaces.

Figuring out how occupational hierarchies in workplaces develop is critical as these may have non-trivial effects on human well-being. For example, previous research finds that being in higher ranked occupations appears to lead to better health outcomes (Fujishiro, Xu, & Gong, 2010), higher self-esteem (Faunce, 1989), more social capital (Van Der Gaag & Snijders, 2005), and more positive social interactions (Matthews et al., 2000). If this is true at the national level, the workplace hierarchy should provide a more refined measurement of these relationships. It may even be the case that the workplace hierarchy is more influential than the national one, as it is inside local spaces that individuals actually live and work together. To the extent that the negative effects of being low on a hierarchy happens through daily social interactions and relations it is plausible that the local hierarchy will impact human well-being more than the national one, at least for outcomes strongly affected by social interactions and relations. Most importantly, understanding how local hierarchies work can enable us to find ways to either reorganize hierarchies in a more egalitarian fashion or at least lessen the effects of hierarchy on human well-being.

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Appendix A. Simulating workplace correlations

In order to test whether or not the results we observe depend on specific individuals matched to actual workplaces or whether the results are driven by structures independent of individuals or workplaces, we have conducted simulations where we randomize characteristics in the data. Technically, we keep the data as is, but change the individual's workplace affiliation in various ways. All simulations are based on a 20 draws. Since the data is large, the standard deviation of the estimated coefficients (i.e., the standard error) is very small, and the number of draws is sufficient.

- 1 Assign individuals, with their real occupations and wages, randomly to workplaces (regardless of the occupational structure of the workplace), keeping the true workplace size distribution intact.

Estimated true rank correlation: .71

Simulated rank correlation: .74 (s.e. = .0011)

Comment: Although this simulation disregards any economic structure whatsoever for workplaces, it suggest that the very uneven size distribution does not drive the correlations.

- 2 Assign individuals, with their real wages, randomly to workplaces keeping the occupational structure of the workplace, the individuals' real occupations, and the true workplace size distribution intact.

Estimated true rank correlation: .71

Simulated rank correlation: .58 (s.e. = .0012)

Comment: This is the only anomaly we can observe. It suggests that some of the correlation is due to the fact that individuals and workplaces select one another on some unobserved attributes. For example, we know from previous research on wage inequality that workplaces with higher than average mean wages tend to attract individuals with higher than average wages (Tomaskovic-Devey et al., 2015). This could also play a role here. The reduction of .13 is however low compared to the remaining correlation of .58, so this is only a weaker tendency.

- 3 One concern is that the correlation we observe are driven by size, simply because large workplaces can host more occupations, that is more datapoints. The simulation here focuses on large workplaces (>200 employees) and randomly splits them into three smaller entities, each with some third of the workers in the original workplace.

Estimated true rank correlation: .76

Simulated rank correlation: .73 (s.e. = .0006)

Comment: This again shows that the uneven size distribution is unlikely to drive any of the results we observe.

- 4 Randomly merge workplaces, i.e., divide data into two portions and let workplaces in one half randomly merge with workplaces in the other with a certain probability. With a 50 percent probability to merge within one of the halves (25 percent mergers in data), the results are as follows.

Estimated true rank correlation: .717

Simulated rank correlation: .720 (s.e. = .0003)

Comments: This again shows that the uneven size distribution is unlikely to drive any of the results we observe.

5 Focusing on small workplaces with < 10 employees, we run the same merging simulation as in point 4. With a 100 percent probability to merge within one of the halves (50 percent mergers in data), which effectively doubles the average workplace size, the results are as follows.

Estimated true rank correlation: .606

Simulated rank correlation: .608 (s.e. = .0009)

Comments: This again shows that the uneven size distribution is unlikely to drive any of the results we observe. Rather, smaller workplaces tend to behave differently than larger ones.

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