



Occupations and Inequality: Theoretical Perspectives and Mechanisms

Andreas Haupt · Christian Ebner

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Abstract People's occupations are strongly related to multiple dimensions of inequality, such as inequalities in wages, health, autonomy, or risk of temporary employment. The theories and mechanisms linking occupations to these inequalities are subject to debate. We review the recent evidence on the relationship between occupations and inequality and discuss the following four overarching theoretical perspectives: occupations and skills, occupations and tasks, occupations and institutions, and occupations and culture. We show that each perspective has strong implications for how scholars conceptualize occupations and which occupational characteristics are seen as relevant when explaining inequalities. Building on this, we review and critically examine the relevant theories related to and the mechanisms of the relationship between occupation and wage inequality, as an example. We conclude that there is sound empirical knowledge available on the relationships between occupations and inequality; however, some of the mechanisms are still unclear.

Keywords Theory of occupations · Skills · Tasks · Occupation-specific mechanisms · Wage inequality

A. Haupt (✉)

Institut für Soziologie, Karlsruher Institut für Technologie
Geb. 01.96, Campus Süd, 76128 Karlsruhe, Germany
E-Mail: andreas.haupt@kit.edu

C. Ebner

Institut für Soziologie, Technische Universität Braunschweig
Bienroder Weg 97, 38106 Braunschweig, Germany
E-Mail: c.ebner@tu-braunschweig.de

Berufe und soziale Ungleichheit. Theoretische Perspektiven und Mechanismen

Zusammenfassung Berufe hängen mit verschiedensten Facetten sozialer Ungleichheit zusammen, darunter sind Lohnungleichheit, Gesundheit, Autonomie oder Risiken befristeter Beschäftigung. Theorien und Mechanismen, die Berufe mit diesen Ungleichheiten verbinden, werden teils kontrovers diskutiert. Wir betrachten neuere Erkenntnisse zum Verhältnis von Berufen und sozialer Ungleichheit und nehmen eine Einordnung in vier übergreifende theoretische Perspektiven vor: Berufe und Fähigkeiten, Berufe und Tätigkeiten, Berufe und Institutionen sowie Berufe und Kultur. Wir zeigen, dass Wissenschaftler Berufe je nach Perspektive unterschiedlich konzeptualisieren und jeweils andere Berufsmerkmale für die Erklärung von Ungleichheiten als relevant erachten. Darauf aufbauend veranschaulichen wir anhand des Beispiels der Lohnungleichheiten berufsspezifische Theorien und Mechanismen entlang der vier beschriebenen Perspektiven. Wir kommen zu dem Schluss, dass es fundiertes empirisches Wissen über die Zusammenhänge zwischen Berufen und sozialer Ungleichheit gibt, die Mechanismen jedoch an mehreren Stellen immer noch unklar sind.

Schlüsselwörter Theorie von Berufen · Fähigkeiten · Tasks · Berufsspezifische Mechanismen · Soziologische Theorie · Lohnungleichheit

1 Introduction

Occupation is a key concept in the social sciences. Its use in explaining the forms and levels of inequality spans over more than a millennium, starting with the early works of Weber, Durkheim, and Marx and continuing to the recent debates about the relationships between occupations and various dimensions of inequality (Avent-Holt et al. 2019; Oesch and Piccitto 2019). Despite some claims regarding a perceived marginalization of occupation in understanding life chances and positions within societies in the past decades (Kim et al. 2018; Beck et al. 1992), occupations and their characteristics persisted as the basis for explaining very diverse dimensions of inequality. Occupations are the basis for various forms of economic inequality (Reichert and Abraham 2017; Nawakitphaitoon and Ormiston 2015). They also strongly contribute to non-economic kinds of inequality. Depending on the occupation, the school-to-work transition quality differs (DiPrete et al. 2017). Different occupations are associated with upward and downward mobility in the labor market (Menze 2017; Mayer et al. 2010). The risk of temporary employment is distributed unevenly across different occupations (Stuth 2017), as are levels of stress (Johnson et al. 2005), opportunities to participate in continuing vocational training (Ehlert 2017), or short sleep duration risks (Shockey and Wheaton 2017).

In comparison to its frequent use in empirical analyses, there is little discussion about the theoretical questions concerning the perspectives of occupation and the theoretical grounds of the relationship between occupation and inequality. The literature provides various, sometimes conflicting, definitions of occupation, which leads

to uncertainties about the use of the concept or to fuzziness in its use (Dostal 2002). Furthermore, in some studies, occupation appears as a predictive variable, but the causal link between occupation or the characteristics of different occupations and the inequality dimension under study remains unclear (Card et al. 2013). In such a case, occupation serves as a placeholder for complex social processes, which link the occupational structure to dimensions of inequality.

We believe that the theoretical argument regarding the relationship between occupations and inequality would profit by first examining the theoretical perspectives on occupations. Here, we argue that at least four perspectives need to be distinguished. First, we discuss an individual perspective, which focusses on *occupation-specific sets of skills*¹. Second, we examine *occupations, tasks, and jobs*, which is a perspective focusing on demand-side characteristics but not employees. Third, we shed light on an *institutional perspective* on occupation. Finally, we discuss the relationship between *culture and occupation*. Our claim is that we need to be aware of all the perspectives to understand the full extent of the possible relationships between occupation and the various dimensions of inequality.

For the purpose of this paper, we treat these perspectives as analytically independent, but we are aware of proposals integrating at least two of them (Damelang et al. 2019; Anteby et al. 2016). Furthermore, we value the research perspectives connecting occupations with industries or organizations (Janietz and Bol 2020; Auspurg et al. 2017). Within this article, we focus on occupation alone, which abstracts from these connections.

We also stress that we do not discuss overarching labor-market theories here. Occupation-specific markets are just one building block within the labor market. They exist in parallel to firm-specific and unspecific labor markets, which can have different logics and mechanisms (Sengenberger 1987). Here, our aim is to focus exclusively on occupation and its relationship to inequality.

In the next step, we spell out four perspectives on that relationship. Each one focuses on very different occupational characteristics, which serve as the starting point for the mechanisms generating occupation-specific inequality. It is far beyond the scope of this paper to offer a comprehensive list of them. Our aim is to review and clarify how scholars (can possibly) argue if they want to make a case that occupation relates to inequality.

2 Four Perspectives on Occupations

Occupations are *social constructs*. Societies can create or eliminate occupations within the framework of training courses and courses of study. They can implement them in laws and file them in official classifications. Associations and companies can advertise occupations. In addition, occupations are also parts of concepts, attitudes, and stereotypes.

¹ We use occupation-specific skills, abilities, and competencies, as well as occupation-specific capital, interchangeably.

Occupations thus represent an *objective reality*, even if they do not exist without people. Their existence has a formative effect on society and people. With occupations, societies structure the acquisition of individual skills within the framework of education systems. Occupations enable organizations to structure work activities along specified work tasks. Institutions regulate access into occupations, occupational behavior, and outcomes. Occupations serve as orientations for (potential) employers and employees about necessary skills, the work environment, and people can adapt their identities to occupational cultures. All these characteristics can result in occupation-specific inequalities. The underlying mechanisms or the conditions of these mechanisms may vary between countries, regions, and over time, adding further complexity.

2.1 Occupations and Skills

Scholars using a perspective on *occupations and skills* focus on the occupational specifics of the labor market *supply*. By using such a perspective, scholars typically abstract from demand-side characteristics such as recruitment into jobs or organizations, the distribution of vacancies, or discrimination. Instead, they focus on the acquisition, formation, heterogeneity, and prices of skills, capabilities, and competencies.

Human capital theory, which gained great popularity owing to Mincer (1974) and Becker (1964), is one prominent example of reasoning using such a perspective. In the early stages, human capital theory did not explicitly account for occupational skills but used schooling and on-the-job experience as the measure of skill. Becker's (1964) notion of specific skills (as opposed to general skills) has usually been referred to as firm-specific and not occupation-specific skills. We also include Bourdieu's capital theory as an example of this perspective. He claimed that skills take the form of embodied cultural capital, which persons transfer into other kinds of capital, such as economic or social capital (Bourdieu 1986). His theory did not include occupation-specific capital either, but paved the way for studies that did.

In particular, human capital theory came under attack for using broad educational categories and experience as skill measures, as well as for abstracting the formation of skill-sets owing to occupations (Blaug 1976). Scholars claimed that theories abstracting from occupational heterogeneity were not sufficient to describe the relevant differences between individuals to understand the dimensions of inequality (Kambourov and Manovskii 2009; England 1982). Thus, social scientists enriched the theories focusing on individual skills referring to occupations.

Such enriched theories needed to define the term occupation. A prominent example defines occupations as “complex, institutionalized bundles of the market-relevant working abilities of persons” (Beck et al. 1980, p. 19; own translation). The emphasis here is the institutionalization of the “bundles” or skill sets. Such a definition has strong implications. First, currently unemployed individuals can have an occupation. For example, people can be “electrical engineers” even if they are not currently employed. Second, it is not important what an individual actually does, only what they are able to do. Third, occupational borders run along skill-sets but

not any other characteristics. Fourth, untypical, non-institutionalized skill-sets may exist, but they do not constitute an occupation.

The core assumption of an occupational perspective on skills is that occupations form skill-sets. The theories using such a perspective assume that skills are not atomistic in the sense that individuals supply one particular skill or supply parts of their skills to different firms, which is an explicit assumption in Human Capital Theory. Individuals supply and employers demand typical *sets of skills*, enabling employees to solve a typical set of problems within the context of paid labor. Thus, both sides have an interest in forming and expressing the expectations of skill-sets to increase the efficiency of matching between the supplied and demanded skills.

The types of skills or skill-sets scholars need to distinguish for meaningful modeling is a matter of debate. Databases such as the O*Net offer very detailed skill-sets for occupations, but for most empirical analyses, scholars need to categorize skills. Some propose a distinction between cognitive, creative, technical or social skills, whereas others include managerial skills, noncognitive skills, or collapse categories (Cobb-Clark and Tan 2011; Liu and Grusky 2013). The scholarly work based on these typologies claims that the differences in the occupational compositions of these skill types are important for various dimensions of inequality. We discuss such theories in Sect. 3.1.

2.2 Occupations, Tasks, and Jobs

A second perspective centers on the *demand side*, focusing on an occupation's relationship to tasks and jobs. For this perspective, two aspects are essential. The first involves the demand-side structures around jobs, which are not endlessly separable. Thus, if an employee fills a job, other candidates with equal skills cannot sell their skills regarding that job. Second, it is important what people (are supposed to) do at work. What people do is contingent on the workplace characteristics and can be largely independent of the skill-set of employees.

A core assumption of this perspective is that employers have typical problem sets within their organizations that are associated with a set of tasks that should solve these problems. Following Acemoglu and Autor (2011, p. 1045), a task "... is a unit of work activity that produces output (goods and services)." A single combination of problems and/or tasks within an organization is a *job*. The International Labour Organization (ILO) thus defines a job as "a set of tasks and duties performed, or meant to be performed, by one person, including for an employer or in self-employment" (International Labour Office 2012, p. 11).

A corresponding *demand-side-oriented definition of occupation* captures occupation as a "set of jobs whose main tasks and duties are characterized by a high degree of similarity" (International Labour Office 2012, p. 11). First, it follows that scholars or practitioners need to define the degree of task similarity constituting an occupation. In doing so, they need to decide how fine-grained the comparison should be. The more specific the task descriptions are, the more detailed and numerous are the resulting occupations. Second, the job characteristics but not skills of employees distinguish occupations. Thus, individuals without a job do not have an occupation according to this definition.

Influential theoretical approaches using this perspective are the job-competition theory (Thurow 1975), the vacancy-competition theory (Sørensen 1977), and the theory of task-biased technological change (Acemoglu and Autor 2011). Early work discussed the consequences of including the existence of jobs, job hierarchies, and vacancies for labor-market outcomes. These theories did not focus much on the role of occupations. More recent theories ask whether broad task types have characteristics connecting them to inequality. These approaches are not necessarily occupation-specific either. Many abstract task types form underlying occupations.

There is, however, very good reason to focus on the relationship between occupations, tasks, and jobs. Jobs (as specific sets of tasks) are typically not unique, because the problems associated with the job are typically not specific to a single workplace within a single organization. Most jobs are the result of functional differentiations of organizations or societies. The prerequisite for a successful division of labor is an efficient coordination of activities and jobs that meet the typical demand for skills within a society. Occupation-specific jobs enable organizations to do this by bundling tasks and jobs efficiently and meaningfully at a higher level of aggregation (Abraham et al. 2018). Thus, the requirements for performing tasks successfully and without large training costs can be very occupation-specific (Gibbons and Waldman 2004). Eventually, the analytical separation of tasks from occupations might not always be feasible (Gathmann and Schönberg 2010).

Even though scholars acknowledge occupation-specific tasks, how to distinguish task characteristics properly is an open debate. An influential typology of tasks is to distinguish between four types by crossing routine/nonroutine and analytical/manual tasks (Autor et al. 2003, p. 1286). Examples of routine analytical tasks are record-keeping, calculation, or reviewing forms. Educating others, giving a medical diagnosis, or lobbying are nonroutine analytical tasks. Manual routine tasks are sorting, picking, or rule-based construction. Manual nonroutine tasks include hair cutting, geriatric care, or janitorial services. The newer taxonomy of Dengler et al. (2014) distinguishes analytical nonroutine tasks, interactive nonroutine tasks, cognitive routine tasks, and manual routine/nonroutine tasks.

In Sect. 3.2, we discuss the mechanisms relating occupations, jobs, and tasks to wage inequality.

2.3 Occupations and Institutions

The third perspective highlights the relationship between *occupations and institutions* (Damelang et al. 2019). Scholars using this perspective study *specific sets of norms* about skills, competencies, behaviors, or, more broadly, the institutional linkages of occupations into social spheres, such as the educational system or the labor market. This perspective captures occupational characteristics from the meso- or macrostructural level, which shape both the skill and the task dimensions of occupations.

Theories using this perspective claim that we need to take the embeddedness of occupations in institutions into account to understand the relationship between occupation and inequality for two reasons. First, institutions solve a fundamental trust problem in recruitment. Second, occupations differ regarding the distribution

of resources in ways that we are not able to explain with differences in tasks and skills alone.

The first point challenges the assumption that employers observe the skills (and productivity) of candidates with educational investment and experience clearly. Recruiters face a huge amount of uncertainty by judging the most productive/skilled candidate based on certificates. Certificates are, in the sense of Bourdieu (1986), institutionalized cultural capital. However, recruiters can rely on the information given by certificates only if they trust that the candidates truly acquired a standardized set of skills, which they associate with the certificate. Only then can recruiters be certain about the competencies of workers to perform the required tasks. However, these certificates can be more or less trustworthy, depending on the grade of institutionalization of occupational training. Recent works show that the level of trustworthiness of occupational degrees is important for recruitment decisions (Columbaro and Monaghan 2009, Stumpf et al. in this volume).

The second point focuses on occupational inequalities that are not based on skill and task differentials. For example, in *The System of Professions*, Andrew Abbott (1988) analyzes how and why occupational groups control knowledge to gain advantages in terms of power, status, and economic resources. He argues that we cannot understand such differences without analyzing how occupations create, shape, and reinforce institutions, such as boards, chambers, associations, or curricula for vocational education. The distinction between a powerful profession and other kinds of occupations is not based on skill or task characteristics alone but also on the relationship between occupations and such institutions.

In light of this, scholars analyzed how occupations created or shaped occupation-specific labor market institutions, such as boards and occupational associations, and what they do (see Giesecke et al. in this volume). Boards administer the self-organization of an occupation (Pagliero 2019). Typically, boards issue licenses, create codes of conduct, report misbehaviors, are responsible for examinations, and counsel the government in occupational affairs. An occupational board is the most powerful tool for an occupation as a collective actor to influence the norms, laws, and the market and to build up the occupation as a profession. Occupational associations are, in contrast, clubs for people with an interest in promoting or developing an occupation. A third form of an occupational institution is the occupational union. Typically, unions work on the industry level, but in some cases, occupations found unions to engage in wage bargaining and strikes (Dütsch et al. 2014). In contrast, boards are typically not permitted to engage in strikes.

Theories on *social closure* expand this perspective beyond the profession/nonprofession distinction and ask which institutionalized rules gain occupations privileged access to resources (Weeden 2002). These rules can be formal or informal. For example, governments can issue formal rules about recruitment through licensing laws. They define which employees are allowed to perform occupational tasks legally (Haupt 2016a). There is no legal ground in Germany that restricts employees from working as data scientists. However, Germans are not allowed to perform heart surgery without a license or to perform the work of physicians—even if these tasks would be performed in private and without pay. A second kind of occupational closure is based on informal recruitment rules (Rohrbach-Schmidt, in

this volume; Bürmann in this volume). In many cases, recruiters are not obliged to select candidates with particular certificates. However, they do so anyway, leading to the exclusion of equally suited candidates in some instances. Some occupations show a third form of closure, i.e., regulating entry into self-employment (Haupt 2016b). Many governments apply rules for the commerce of weapons and drugs, or services for physicians and advocates. In addition, some countries regulate the self-employment of crafts (Rostam-Afschar 2014; Damelang et al. 2017).

The aforementioned norms target entry into occupations. Some occupations face additional rules for the prices of their services (Rostam-Afschar and Strohmaier 2019; Haupt 2016a). Moreover, some occupations are subject to minimum wage laws—either by defining special minimum wages or by exempting them (Skedinger 2006; Schiller 1994).

Our discussion makes it clear that occupations are related to a country's institutional structure in many ways. We discuss inequality-generating mechanisms with these occupational characteristics as starting points in Sect. 3.3.

2.4 Occupations and Culture

The fourth perspective relates to *occupations and culture*. Within this perspective, we distinguish two lines of reasoning. First, scholars place occupations in a societies' culture, with its shared attitudes, knowledge, and stereotypes. Second, occupations can form a specific culture, which scholars can analyze and use for explanations of inequality.

The occupational knowledge is deeply rooted among the members of a society. In her work *Theory of Circumscription and Compromise*, Linda Gottfredson (1981) claims that people often share similar images of occupations within a culture (occupational stereotypes). For example, there are ideas about what certain respected occupations are like, the degree to which occupations are “male” or “female”, and what the typical fields of activity are for job holders. Such occupational images are already consolidated in the course of primary socialization via family, friends, educational institutions, or the mass media. In addition, collective actors, such as employers' associations or trade unions, try to convey certain job descriptions to the population and make occupations visible. Individuals particularly strive for certain occupations when their occupational images agree with their self-concept, i.e., how they view themselves, privately and publicly. Such cultural concepts lead to the group-specific selection of and employment duration within occupations.

People shape and consolidate specific occupational cultures. In line with Weeden and Grusky (2005), we describe a three-step process leading to occupation-specific identities, attitudes, perceptions, or preferences but also to occupation-specific segregation. These three steps are as follows:

- 1) Self-selection. Individuals have certain occupational stereotypes in mind. Mirroring these stereotypes with their own self-concept, attitudes, abilities, and value orientations, individuals strive for occupations that fit their aspirations particularly well.

2) Gatekeeper selection. The gatekeepers within a network are more prone to granting access to persons who have adequate attitudes and values (Petersen et al. 2000).

3) Socialization. Training in an occupation, facing similar working conditions, as well as social interactions with the incumbents of occupations, reinforces existing attitudes, values, and practices. Practitioners of an occupation do not only share attitudes, value orientations, and practices, they can also form an identity specific to the occupation. In summary, these processes can result in occupation-specific cultures that are able to influence life chances, political participation, and lifestyles.

Some scholars conclude from this that occupations as microclasses serve as better grounds for analysis than traditional big classes (Weeden and Grusky 2005; Jonsson et al. 2009). Such microclasses “emerge around functional niches in the division of labor” (Weeden and Grusky 2005, p. 142) and represent comparatively homogeneous groupings of employed persons, which may reflect the reality of life in postmodern societies better than established large-scale class concepts (for more information on occupational status scales and class schemes, see Bernhard et al. in this volume).

In Sect. 3.4, we discuss the mechanisms relating occupations and culture to wage inequality.

3 Occupations and Wage Inequality

The four perspectives above can be very useful for explanations of inequality. Here, we discuss their application for explaining occupation-specific wage inequality. The distribution of wages is by far the best-studied phenomenon in inequality research, offering multiparadigmatic and sometimes conflicting theoretical approaches. A broad stream of literature shows the close link between occupations and wage inequality for a wide range of countries (Mouw and Kalleberg 2010; Williams 2013; Card et al. 2013; Kampelmann and Rycx 2012). However, the mechanisms gener-

Table 1 Selected theories and mechanisms linking occupations to wage inequality

Perspective	Theory	Inequality-generating mechanism
<i>Skills</i>	Occupation-specific human capital	Deviations from productivity pay
	Skill-biased technological change	Skill mismatches
<i>Tasks/jobs</i>	Job competition theory	Social positioning
	Occupation-specific tasks	Occupation-specific substitutability
	Task-biased technological change	
<i>Institutions</i>	Screening theory	Occupation-specific trustworthiness
	Credentialism/social closure	Artificial undersupply
<i>Culture</i>		Occupation-specific channeling
	Occupational stereotypes	Self-selection into more/less rewarding occupations
	Occupation-specific network theory	Worth construction
	Discrimination theory	Statistical and taste-based discrimination

ating occupation-specific wage inequality are still subject to debate. We review the prominent research on occupation-specific approaches to wage inequality to reflect state-of-art theories. It is our aim to show opportunities for theoretical reasoning regarding these mechanisms from different perspectives. Furthermore, we reflect the need for further theory building. Table 1 provides an overview of the perspectives, selected theories and associated mechanisms.

3.1 Occupations, Skills, and Wages

Human Capital Theory assumes that productivity is observable and that pay is a direct consequence of productivity. Such a direct link between skills, productivity, and wages is not always theoretically feasible but can be a good (first) approximation for studying the role of occupations in the relationship between skills and the distribution of wages (Beyer and Knight 1989).

As we pointed out above (Sect. 2.1), individuals do not supply one particular skill, but typical skill-sets, which are more or less specific to different occupations. Some occupational skills can be more investment intensive. The wages paid for them are higher than those of other skills if employers expect an undersupply owing to a lack of compensation for a higher individual investment. Thus, the price for the wage does not only reflect productivity but also the (expected) scarcity of skills.

Furthermore, the acquisition of particular occupational skills can need higher amounts of talent or of general skills, such as intelligence, stress resistance, or language skills, than others (Ghatak et al. 2007). Employers can prefer workers with such skills and pay them higher wages. This results in occupation-specific wage differentials.

Human Capital Theory also assumes that employees can separate their skills infinitely and sell them to different employers. This very strong assumption does not reflect the labor market mechanics well. Skills are embodied in people and people cannot separate themselves infinitely. Thus, they need to provide their skills to a small number of employers, but typically only to one. In some cases, employers do not need (or buy) all the skills of the employee's occupational skill-set, resulting in a poor match between the employee's skills and the employer's demands, reducing their productivity. Thus, these employees receive wage disadvantages compared with employees with better skill matches. Recent work focussing on the matching process and its consequences show such a pattern empirically (Nordin et al. 2010; Rohrbach-Schmidt and Tiemann 2011; Bol et al. 2019).

Finally, *changes* in the demand for occupation-specific skills alter their prices and, consequently, occupational wages. The theory of skill-biased technological change (SBTC) argues that shifts in production based on computerization increased the demand for and return to high-skilled employees and, thus favors occupations with cognitive skills (Berman et al. 1998). In light of this, Liu and Grusky (2013) explain increases in between-occupational wage inequality in the USA between 1970 and 2010, with changed returns for cognitive, creative, technical, and social skills. Analytical skills, as a subdomain of cognitive skills, showed the steepest increase in returns. However, Beaudry et al. (2016) demonstrate a "great reversal" of the returns

for cognitive skills after the tech bust in 2000, which was reinforced by the 2008 financial crisis. This is not in line with a simple SBTC theory.

The literature offers several other pieces of conflicting evidence for SBTC, leading to the impression that this theory is too simple (Hutter and Weber 2017; Card and DiNardo 2002; Acemoglu and Autor 2011). On a theoretical level, it is still far from clear in what way skill-related demand shifts influence occupations and occupational wage inequality. Does it matter that an occupation only includes a type of skill, such as analytical thinking, or must it be the main skill? Furthermore, general concepts such as “cognitive skills” can refer to very heterogeneous abilities for specific occupations. For a physician, it typically means diagnosing, for an investment banker, analyzing economic opportunities. Currently, these theories assume that an average return for the type of skill across occupations is informative about a general, underlying process. We do not know whether that is correct. This may be true for some occupations (managers, bankers), which can strongly influence the overall picture, but for others, this type of skill may not influence wages in the same manner.

3.2 Occupations, Tasks, Jobs, and Wages

Mechanisms relying on skill differentials typically abstract from jobs and their characteristics, as well as their relationship with occupations. Within this section, we discuss theories that place job and task characteristics at the center of the analysis.

Firms and organizations typically form their labor demands on the grounds of occupation-specific task sets, leading to occupation-specific job pools within the firms (Sørensen and Kalleberg 1977). Such pools can have three consequences.

First, firms attribute specific tasks to occupations. Firms typically do not split task bundles but assign them as bundles to occupations. If some tasks within these bundles are more rewarding, the occupations’ exclusive (or stronger) relation to these tasks leads to higher occupational wages. Rohrbach-Schmidt (2019) offers evidence for this mechanism but also highlights the relevance of task variability within occupations for between-worker inequality.

Second, occupations sort across firms and organizations in particular ways. Furthermore, firms and organizations can have very different product–market power levels, resulting in higher revenues—independent of the workers’ productivity (Sørensen 1996). If firms share such rents *and* occupations sort differently over firms with more/less product market power, then occupations are able to profit from rent-sharing differently, which explains some of the between-occupation inequality (Card et al. 2014).

Third, firms can decide to outsource or out-contract specific tasks of whole job pools. If tasks or jobs have a strong link to particular occupations, some occupations are more affected by out-contracting and outsourcing. Both lead to a decline in the employees’ power in wage bargaining (Goldschmidt and Schmieder 2017). Thus, occupation-specific wage inequality can be based on the changing power relations due to employment dualization, but studies analyzing this mechanism are very scarce (Ochsenfeld 2018).

The previous reasoning focused on the structural characteristics of jobs and tasks from a cross-sectional perspective. Such a perspective does not analyze the changes in task demands. However, a large discussion in the wake of the Task-Biased Technological Change (TBTC) Theory focused on such changes and how they influenced wage inequality. At its core, the theory claims that technological changes increased the replaceability of some tasks and enhanced the demand for others. Thus, the occupations associated with these tasks suffered or profited in specific ways. The main prediction of TBTC is that the middle of the occupational wage structure hollowed out because these occupations have a strong connection to routine tasks, which could either be replaced by computers or performed cheaper offshore. Instead, the demand for low-skilled, not offshorable service tasks, as well as high-skilled cognitive nonroutine tasks increased, leading to a polarization of the employment and wage structure (Spitz-Oener 2006; Acemoglu and Autor 2011).

Fortin and Lemieux (2016) strongly connect the changes of wages within and between occupations in the USA to the changed demand for tasks. However, the support for this hypothesis outside the USA is very limited (Antonczyk et al. 2009; Oesch and Menes 2011; Goos and Manning 2007) and Oesch and Piccitto (2019) even claim it to be a myth for European countries. The empirical picture relating occupations, different tasks, and wages is very mixed. Some find no to weak relations between tasks and (occupational) wages (Antonczyk et al. 2009; Salvatori 2018; Fernández-Macías and Hurley 2016). Some studies find substantial wage effects of task offshoring on occupational wages (Baumgarten et al. 2013; Goos et al. 2014), whereas others, such as Reichelt et al. (in this volume) show no results on overall wage inequality. The same mixed picture is offered by the literature on the relation of occupations, automation, and wages (Autor 2015). Automation replaced labor in some occupations but seems to have increased it in others (Atkinson and Wu 2017). Autor and Dorn (2013) report a strong increase in low-skilled service jobs in the USA owing to technological change, but Oesch (2013) does not find such patterns for European societies.

The relation between task changes and wage inequality is thus a very complex one, plausibly incorporating many overlaying mechanisms. The mixed picture may be a result of such overlaying processes. Technological change and offshorability are not the only two factors influencing the distribution of tasks within a society. Within the past decades, Western societies witnessed an upswing in the demand for elderly care, education, legal services, and health care (Witte and Haupt 2019; Santiago 2002; Michelson 2013; Dwyer 2013). Some of these changes are the results of population change, while others, such as the increase in pre-school education in Germany, result from changing norms within a society (see Grgic in this volume). It is not clear how TBTC relates to such processes and how the combination of these influences shapes the occupational composition and wage structure of societies.

Furthermore, technological change targets only some tasks associated with occupations, but rarely all of them (Dengler and Matthes 2018). Thus, occupations can adapt to the challenges from the substitution potentials of their associated tasks. For some occupations, technological change or offshorability may even increase the productivity for those occupations (see Reichelt et al. in this volume). In addition, the

processes associated with task changes can lead to the creation of new occupations. Our knowledge about these processes is very sparse and subject to future work.

3.3 Occupations, Institutions, and Wages

Employees have a strong interest in signaling their productivity with certificates and firms use them as major sources to screen a candidate's capabilities (Stiglitz 1975). Moreover, firms are interested in reducing the risk of unproductive employees (often referred to as *lemons* in line with Akerlof (1970)). As we discussed in Sect. 2.3, the screening of an employee's capabilities on the grounds of occupational certificates is only feasible if employers trust the information given by the institutions issuing certification. However, trust in an occupational certificate is not an easily established concept. It is based strongly on formal institutionalization, which is a process of setting and enforcing rules about occupational training and certification by authorities (Albert 2016). For example, German vocational education curricula and occupational certificates are the result of formalized application and negotiation processes between all interest groups involved and explicitly include employer representatives, who are concerned with a high degree of fit between the job descriptions and the requirement profiles of the companies' jobs. This is a highly formal and institutionalized way of securing trust in the information given by occupational certificates. If employers do not trust or have doubts about the information given by certificates, candidates have lower labor-market success (Tholen 2019).

The theories of *credentialism* and *social closure* (Brown 2001; Murphy 1988) explore the (un)intended consequence of excluding alternative candidates based on the strong emphasis on certificates. Recruitment processes focusing on (trustworthy) occupational certificates limit the supply of candidates able to fill these positions (Weeden 2002). The literature offers at least three different processes that can lead to the exclusion of candidates.

First, organizations or firms form strong informal rules for occupation-specific recruitment. We can expect such rules in markets with a steady supply of candidates with occupational skill sets certified by trustworthy institutions. In such cases, recruiters rely strongly on this signal and have a tendency to exclude others (Behrenz 2001; Bangerter et al. 2012). Their main reason for the exclusion is the reduction of training costs for candidates with a lesser skill match (Bills et al. 2017). A consequence of such recruitment is the formation of closed occupation-specific labor markets, with high barriers to entry—even if it is an unintended consequence of a firm's recruitment behavior (Haupt 2012). We know very well that the more closed an occupational labor market is, the higher are the average wages of the employees inside this market (Weeden 2002; Haupt 2012; Bol and Drange 2017; Bol and Weeden 2015; van de Werfhorst 2011). It is, however, an open debate as to which mechanisms are responsible for this relationship. Most importantly, the literature needs to answer why *employers* should react to degrees of closure (or characteristics associated with it) with higher wages. The most common argument is that closure artificially reduces the supply of employees, thereby creating a labor supply shortage, which leads to higher wages for those who are able to enter the market. If that were the case, we should observe larger shares of vacancies or longer episodes

of unfilled vacancies in more closed labor markets (Haupt 2012; Cardona 2013). However, the empirical evidence for both is lacking (Damelang et al. 2019). A further argument concerns the increased matching efficiency based on occupational closure. If an occupation supplies a very special skill set for a particular market segment in a trustworthy way, they are the most productive alternatives among all candidates and do not need the same amount of further training. Thus, employers compete for them with higher wages. The literature offers some evidence for this claim (Haupt 2012; Bol et al. 2019; Ehlert 2017).

Second, the literature offers broad evidence that employers tend to devalue foreign certificates because they attribute lower signal strength regarding the expected occupational skills or find them to be less trustworthy (Damelang and Abraham 2016; Kreyenfeld and Konietzka 2002; Ebner and Helbling 2016). As a result, migrants work with lower probability in more rewarding closed occupational markets, have a higher risk of skill mismatch, and earn lower wages on average (see the articles by Rohrbach-Schmidt and Bürmann in this volume).

Third, countries can have legal rules for occupation-specific recruitment (licensing laws). Typically, the literature views licensing as the strongest form of occupational social closure (Koumenta et al. 2014). As for the case of general social closure, the literature offers broad evidence for the association of licensed occupations with higher wages (Weeden 2002; Pagliero 2011; Kleiner and Krueger 2013; Witte and Haupt 2019). There are, however, some studies showing conflicting evidence. Law and Marks (2013) compare the wages of registered and practical nurses between 1950 and 1970 in the USA. During this time, these occupations changed from certification to licensing in some states but remained certified in others. Using a difference-in-difference approach, the authors estimate no changes in wages attributable to this change in market regulation. The study by Redbird (2017) uses between-state variation of licensing over time to study the wage effects of licensing in the USA. Her estimates do not show a significant positive relationship between the licensing of an occupation and its mean wage trend. In addition to the conflicting empirical evidence, all theoretical problems of the connection between social closure and wages apply to licensing. The common claim regarding a labor supply shortage seems theoretically sound (if the market would be in equilibrium without licensing), but we do not have strong empirical evidence about artificial labor shortages based on licensing. It is plausible that other mechanisms, such as product market power, price setting, or network formation, work in favor of higher wages for licensed occupations, but our knowledge about them is very thin (see the discussion in Haupt 2020).

We know very little about the processes linking other occupational institutions, such as occupational associations or boards, to wage inequality (Pagliero 2019; Matthes and Vicari 2019). We do not know exactly how these institutions influence employee's wages, and the empirical patterns for such a relationship are mixed (see Giesecke et al. in this volume).

3.4 Occupations, Culture, and Wages

The previous theories about the mechanisms between occupations and wages typically do not take the cultural context into account, which embeds occupations or the country's labor market as a whole. However, we have strong evidence that culture is very important for hiring, careers, wage setting, or non-economic advantages (Bills et al. 2017; Rivera 2012; Hora 2020).

A variety of culturally induced processes of occupation-specific wages can be demonstrated by referring to the issue of occupational gender wage inequality. The research relying on gender theories of occupational selection and pay analyze the gender-specific attitudes and perceptions of the worth of labor (Busch 2013). Cultures define which occupations or occupational tasks are men's and women's work. People typically perceive men's work as being more skill intensive and of higher economic worth than women's work (Cohen and Huffman 2003; Charles and Grusky 2004; Hausmann et al. 2015). In light of this, wage offers are not only a result of productivity but also a product of the worth construction that is deeply rooted in the cultural perceptions of occupations, tasks, and gender. For example, Kricheli-Katz (2019) varies the information about the feminization of an occupation in a recruitment experiment and shows that recruiters believing to be in a female-dominated occupation devalue the competencies of female candidates. This experiment complements other research findings correlating (changing) female shares within an occupation with lower wages, which is in line with predictions on devaluing women's work (Leuze and Strauß 2016; England et al. 2007).

However, the relationship between gender, occupations, and wages is much more complex than devaluation. Adolescents have perceptions about occupation-specific stress or competition. Students with a careerist approach to higher education and the labor market are more prone to selecting majors with higher returns (Ochsenfeld 2014). The distributions of careerist attitudes, competition preferences, or the importance of money are gendered themselves, reflecting deeply embedded cultural socialization processes. They result in both occupational sex segregation and wage inequality between genders across occupations (Sinclair et al. 2019; Morgan et al. 2013).

Occupations can also form norms about typical working hours. In some occupations, it is acceptable to work part-time, while other occupations demand large amounts of overwork (Buchmann et al. 2010; Cha 2013). In combination with a culture attributing family-care work to women, family-friendly part-time occupations are attractive to women, but overwork-prone occupations are not. However, overwork pays off, because firms attribute higher levels of productivity and commitment to workers who work overtime (Weeden et al. 2016). The result is a reinforcement of gender-wage inequality (Cha and Weeden 2014). Goldin and Katz (2016) show that changing norms regarding overwork within pharmacies in the USA resulted in egalitarian gender shares and declining gender-wage inequality.

Social networks play a role in these processes too (England and Folbre 2005). Networks tend to develop on the basis of similar personal characteristics (social homophily). Gender-segregated networks strengthen existing views, roles and norms

through processes of socialization. On the other hand, access to (well-paid) occupational positions takes place informally via networks.

Furthermore, occupations can form specific cultures influencing inequality. Traditional gender-dominated occupations can create gender-specific cultures, giving rise to *discrimination*. Automobile engineering, construction, or crafts show very masculine cultures in many societies, which lead to higher probabilities of conflict with other genders that may be viewed as “not employable” or “not fitting” into the occupation (Collinson 1988; Huppatz 2012). The crowding assumption holds that women are being discriminated against with regard to entering typical male occupations. This results in an oversupply of typical female occupations, which lowers the wages in these occupations.

The mechanisms discussed here also work with other categories apart from gender—any cultural shared stereotype related to occupations fit into these. We selected gender as a prominent example here, but stress that gender is, of course, only one out of many possible social categories.

4 Conclusion and Outlook

Within this article, we discussed four different perspectives on occupations: their skill set, their associated task set, their institutional characteristics, and their relation to culture. We believe that it is very useful to reflect on the perspective used within our own research to clarify the concept of occupation and to set a starting point for theoretical arguments. Possible misunderstandings between researchers may stem from the parallel use of different perspectives.

We do not claim the four perspectives to be the only ones. There may be others, e.g., from other theories, such as structural functionalism, other disciplines, such as theology, or from a practitioner’s perspective outside of academia. Our aim was to reflect the most frequently used perspectives in the social sciences, and we claim that these four are the most important. Further research may add to our list of perspectives to build up our cumulative knowledge of occupations and their relationships with inequality.

Given one perspective, we showed a typical reasoning about mechanisms linking occupations and inequality. We argued that occupations are not able to act themselves—even if some shortcut formulations in prominent articles suggest otherwise. Any theory about the relationship between occupations and dimensions of inequality must lay down how occupations or their characteristics influence the opportunities or mental states of people to open the black box.

We showed the fruitfulness of each perspective by applying mechanisms stemming from each one on wage inequality. The mechanisms linking occupational skills to wage inequality build on employee or candidate characteristics, their supply, and their prices. Each one can be influenced by occupations, as we showed above. The link between occupations, tasks, and wages is based on job characteristics. If firms or organizations change these job characteristics, occupations and occupational wages are affected accordingly. We further discussed the mechanisms linking the institutional characteristics of occupations to wage inequality. The reasoning about these

mechanisms starts with the identification of institutionalized occupational characteristics and must then show how they affect the selection of the occupational training, recruitment, prices, and wages. That is not always the case in the literature and leaves much room for further research. The mechanisms linking occupations, culture, and wage inequality start with the place of occupations within a culture or the characteristics of the occupation-specific culture and then show how they alter beliefs, attitudes, or opportunities.

The research on occupations and inequality is complex, because occupations are part of almost any part of societal life. Our aim with this article was to both show this complexity and discuss how to handle it. It is our hope that further research can build upon the argumentation we proposed here. We have a good understanding of the relationships between occupations and inequality—but we can still dig deeper. Careful theory building along the discussed perspectives can be a very fruitful step toward this future.

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References

- Abbott, Andrew. 1988. *The system of professions: An essay on the division of expert labor*: University of Chicago Press.
- Abraham, Martin, Andreas Damelang and Andreas Haupt. 2018. Berufe und Arbeitsmarkt. In *Arbeitsmarktsoziologie: Probleme, Theorien, empirische Befunde*, eds. Martin Abraham and Thomas Hinz, 225–259. Wiesbaden: Springer Fachmedien Wiesbaden.
- Acemoglu, Daron, and David H. Autor. 2011. Skills, Tasks and Technologies: Implications for Employment and Earnings. Chapter 12. In *Handbook of Labor Economics*, eds. David Card and Orley Ashenfelter, 1043–1171: Elsevier.
- Akerlof, George A. 1970. The Market for “Lemons”. Quality Uncertainty and the Market Mechanism. *The quarterly Journal of Economics* 84:488–500.
- Albert, Kyle. 2016. Who benefits most from occupational certification? An examination of young workers. *Social science research* online first:in press.
- Anteby, Michel, Curtis K. Chan and Julia DiBenigno. 2016. Three lenses on occupations and professions in organizations: Becoming, doing, and relating. *The Academy of Management Annals* 10:183–244.
- Antonczyk, Dirk, Bernd Fitzenberger and Ute Leuschner. 2009. Can a Task-Based Approach Explain the Recent Changes in the German Wage Structure? *Jahrbücher für Nationalökonomie und Statistik / Journal of Economics and Statistics* 229:214–238.
- Atkinson, Robert D., and J. J. Wu. 2017. False alarmism: Technological disruption and the US labor market, 1850–2015. *Information Technology & Innovation Foundation ITIF, May*.
- Auspurg, Katrin, Thomas Hinz and Carsten Sauer. 2017. Why Should Women Get Less? Evidence on the Gender Pay Gap from Multifactorial Survey Experiments. *American Sociological Review* 82:179–210.
- Autor, David H. 2015. Why Are There Still So Many Jobs? The History and Future of Workplace Automation. *Journal of Economic Perspectives* 29:3–30.

- Autor, David H., and David Dorn. 2013. The Growth of Low-Skill Service Jobs and the Polarization of the US Labor Market. *American Economic Review* 103:1553–1597.
- Autor, David H., Frank Levy and Richard J. Murnane. 2003. The skill content of recent technological change: An empirical exploration. *The quarterly Journal of Economics* 118:1279–1333.
- Avent-Holt, Dustin, Lasse F. Henriksen, Anna E. Hägglund, Jiwook Jung, Naomi Kodama, Silvia M. Melzer, Eunmi Mun, Anthony Rainey and Donald Tomaskovic-Devey. 2019. Occupations, workplaces or jobs?: An exploration of stratification contexts using administrative data. *Research in Social Stratification and Mobility*:100456.
- Bangerter, Adrian, Nicolas Roulin and Cornelius J. König. 2012. Personnel selection as a signaling game. *Journal of Applied Psychology* 97:719.
- Baumgarten, Daniel, Ingo Geishecker and Holger Görg. 2013. Offshoring, tasks, and the skill-wage pattern. *European Economic Review* 61:132–152.
- Beaudry, Paul, David A. Green and Benjamin M. Sand. 2016. The Great Reversal in the Demand for Skill and Cognitive Tasks. *Journal of Labor Economics* 34:S199–S247.
- Beck, Ulrich, Michael Brater and Hansjürgen Daheim. 1980. *Soziologie der Arbeit und der Berufe: Grundlagen. Problemfelder, Forschungsergebnisse*. Reinbek bei Hamburg: Rowohlt.
- Beck, Ulrich, Scott Lash and Brian Wynne. 1992. *Risk society: Towards a new modernity*, vol. 17: Sage.
- Becker, Gary S. 1964. Human Capital: A Theoretical and Empirical Analysis, with Special Reference to Education. *University of Illinois at Urbana-Champaign's Academy for Entrepreneurial Leadership Historical Research Reference in Entrepreneurship*.
- Behrenz, Lars. 2001. Who gets the job and why? An explorative study of employers' recruitment behavior. *Journal of Applied Economics* 4:255–278.
- Berman, Eli, John Bound and Stephen Machin. 1998. Implications of skill-biased technological change: international evidence. *The quarterly Journal of Economics* 113:1245–1279.
- Beyer, Joy de, and John B. Knight. 1989. The role of occupation in the determination of wages. *Oxford Economic Papers* 41:595–618.
- Bills, David B., Valentina Di Stasio and Klarita Gërxhani. 2017. The demand side of hiring: Employers in the labor market. *Annual Review of Sociology*. 43:291–310.
- Blaug, Mark. 1976. The empirical status of human capital theory: A slightly jaundiced survey. *Journal of Economic Literature* 14:827–855.
- Bol, Thijs, and Ida Drange. 2017. Occupational closure and wages in Norway. *Acta Sociologica* 60:134–157.
- Bol, Thijs, and Kim A. Weeden. 2015. Occupational Closure and Wage Inequality in Germany and the United Kingdom. *European Sociological Review* 31:354–369.
- Bol, Thijs, Christina Ciocca Eller, Herman G. van de Werfhorst and Thomas A. DiPrete. 2019. School-to-Work Linkages, Educational Mismatches, and Labor Market Outcomes. *American Sociological Review* 84:275–307.
- Bourdieu, Pierre. 1986. The forms of capital. In *Handbook of Theory and Research for the Sociology of Education*, ed. Jan Richardson, 241–258. Greenwood: Westport.
- Brown, David K. 2001. The social sources of educational credentialism: Status cultures, labor markets, and organizations. *Sociology of Education Extra Issue*:19–34.
- Buchmann, Marlis C., Irene Kriesi and Stefan Sacchi. 2010. Labour market structures and women's employment levels. *Work, Employment & Society* 24:279–299.
- Busch, Anne. 2013. The impact of occupational sex segregation on the "Gender Pay Gap". *KZfSS Kölner Zeitschrift für Soziologie und Sozialpsychologie* 65:301–338.
- Card, David, and John E. DiNardo. 2002. Skill Biased Technological Change and Rising Wage Inequality: Some Problems and Puzzles. *Journal of Labor Economics* 20:733–783.
- Card, David, Jörg Heining and Patrick Kline. 2013. Workplace Heterogeneity and the rise of West German wage inequality. *The quarterly Journal of Economics* 128:967–1015.
- Card, David, Francesco Devicienti and Agata Maida. 2014. Rent-sharing, holdup, and wages. Evidence from matched panel data. *The Review of Economic Studies* 81:84–111.
- Cardona, Andrés. 2013. *Closing the Group or the Market? The Two Sides of Weber's Concept of Closure and Their Relevance for the Study of Intergroup Inequality*. SFB 882 Working Paper Series No. 15: DFG Research Center (SFB) 882 From Heterogeneities to Inequalities.
- Cha, Youngjoo. 2013. Overwork and the persistence of gender segregation in occupations. *Gender and Society* 27:158–184.
- Cha, Youngjoo, and Kim A. Weeden. 2014. Overwork and the Slow Convergence in the Gender Gap in Wages. *American Sociological Review* 79:457–484.

- Charles, Maria, and David B. Grusky, eds. 2004. *Occupational ghettos. The worldwide segregation of women and men*. Stanford: Stanford University Press.
- Cobb-Clark, Deborah A., and Michelle Tan. 2011. Noncognitive skills, occupational attainment, and relative wages. *European Association of Labour Economists 21st annual conference, Tallinn, Estonia, 10-12 September 2009* 18:1–13.
- Cohen, Philip N., and Matt L. Huffman. 2003. Occupational Segregation and the Devaluation of Women's Work across U.S. Labor Markets. *Social Forces* 81:881–908.
- Collinson, David L. 1988. 'Engineering humour': masculinity, joking and conflict in shop-floor relations. *Organization Studies* 9:181–199.
- Columbaro, Norina L., and Catherine H. Monaghan. 2009. Employer perceptions of online degrees: A literature review. *Online Journal of Distance Learning Administration* 12.
- Damelang, Andreas, and Martin Abraham. 2016. You Can Take Some of It with You! *Zeitschrift für Soziologie* 45:91–106.
- Damelang, Andreas, Andreas Haupt and Martin Abraham. 2017. Economic consequences of occupational deregulation. Natural experiment in the German crafts. *Acta Sociologica*:online first.
- Damelang, Andreas, Michael Stops and Martin Abraham. 2019. Occupations as labour market institutions. Occupational regulation and its effects on job matching and occupational closure. *SozW Soziale Welt* 69:406–426.
- Dengler, Katharina, and Britta Matthes. 2018. The impacts of digital transformation on the labour market: Substitution potentials of occupations in Germany. *Technological Forecasting and Social Change* 137:304–316.
- Dengler, Katharina, Britta Matthes and Wiebke Paulus. 2014. Occupational tasks in the German labour market. Nürnberg: Forschungsdatenzentrum der Bundesagentur für Arbeit im Institut für Arbeitsmarkt- und Berufsforschung.
- DiPrete, Thomas A., Thijs Bol, Christina C. Eller and Herman G. van de Werfhorst. 2017. School-to-Work Linkages in the United States, Germany, and France. *American Journal of Sociology* 122:1869–1938.
- Dostal, Werner. 2002. Der Berufsbegriff in der Berufsforschung des IAB. In *IAB-Kompodium Arbeitsmarkt- und Berufsforschung. Beiträge zur Arbeitsmarkt- und Berufsforschung*, ed. Gerhard Kleinherz, 463–474. Nürnberg.
- Dütsch, Matthias, Cathrin Gückelhorn, Gesine Stephan and Olaf Struck. 2014. Hohe Gehaltssteigerungen durch Berufsgewerkschaften–Gerechtigkeitsbewertungen und Folgewirkungen. *KZfSS Kölner Zeitschrift für Soziologie und Sozialpsychologie* 66:517–548.
- Dwyer, Rachel E. 2013. The Care Economy? Gender, Economic Restructuring, and Job Polarization in the U.S. Labor Market. *American Sociological Review* 78:390–416.
- Ebner, Christian, and Marc Helbling. 2016. Social distance and wage inequalities for immigrants in Switzerland. *Work, Employment & Society* 30:436–454.
- Ehlert, Martin. 2017. Who Benefits from Training Courses in Germany? Monetary Returns to Non-formal Further Education on a Segmented Labour Market. *European Sociological Review* 33:436–448.
- England, Paula. 1982. The failure of human capital theory to explain occupational sex segregation. *Journal of Human Resources* 17:358–370.
- England, Paula, and Nancy Folbre. 2005. Gender and economic sociology. In *The handbook of economic sociology*, 2nd ed., eds. Neil J. Smelser and Richard Swedberg, 627–649. Princeton, N.J., New York: Princeton University Press.
- England, Paula, Paul Allison and Yuxiao Wu. 2007. Does bad pay cause occupations to feminize, Does feminization reduce pay, and How can we tell with longitudinal data? *Social science research* 36:1237–1256.
- Fernández-Macías, Enrique, and John Hurley. 2016. Routine-biased technical change and job polarization in Europe. *Socio-Economic Review* 15:563–585
- Fortin, Nicole, and Thomas Lemieux. 2016. Inequality and Changes in Task Prices: Within and between Occupation Effects. In *Inequality. Causes and Consequences*. Research in Labor Economics Series, Bd. 43, eds. Solomon W. Polachek, Konstantinos Tatsiramos and Lorenzo Cappellari, 195–226. Bingley: Emerald Group Publishing Limited.
- Gathmann, Christina, and Uta Schönberg. 2010. How general is human capital? A task-based approach. *Journal of Labor Economics* 28:1–49.
- Ghatak, Maitreesh, Massimo Morelli and Tomas Sjöström. 2007. Entrepreneurial talent, occupational choice, and trickle up policies. *Journal of Economic Theory* 137:27–48.
- Gibbons, Robert, and Michael Waldman. 2004. Task-specific human capital. *American Economic Review* 94:203–207.

- Goldin, Claudia, and Lawrence F. Katz. 2016. A most egalitarian profession: pharmacy and the evolution of a family-friendly occupation. *Journal of Labor Economics* 34:705–746.
- Goldschmidt, Deborah, and Johannes F. Schmieder. 2017. The rise of domestic outsourcing and the evolution of the German wage structure. *The Quarterly Journal of Economics*,
- Goos, Maarten, and Alan Manning. 2007. Lousy and Lovely Jobs. The Rising Polarization of Work in Britain. *Review of Economics and Statistics* 89:118–133.
- Goos, Maarten, Alan Manning and Anna Salomons. 2014. Explaining job polarization: Routine-biased technological change and offshoring. *American Economic Review* 104:2509–2526.
- Gottfredson, Linda S. 1981. Circumscription and compromise: A developmental theory of occupational aspirations. *Journal of Counseling psychology* 28:545.
- Haupt, Andreas. 2012. (Un)Gleichheit durch soziale Schließung. Effekte offener und geschlossener Teilarbeitsmärkte auf die Lohnverteilung in Deutschland. (Un)equal through social closure. Effects of open and closed labour markets on wages in Germany. *Kölner Zeitschrift für Soziologie und Sozialpsychologie* 64:729–753.
- Haupt, Andreas. 2016a. Erhöhen berufliche Lizenzen Verdienste und die Verdienstungleichheit? *Zeitschrift für Soziologie* 45:39–56.
- Haupt, Andreas. 2016b. *Zugang zu Berufen und Lohnungleichheit in Deutschland*. Wiesbaden: Springer VS.
- Haupt, Andreas. 2020. *Institutional variation in occupational licensing and its consequences for wage inequality. A distributional analysis for the USA and Germany*.
- Hausmann, Ann-Christin, Corinna Kleinert and Kathrin Leuze. 2015. Devaluation of Female Occupations or Devaluation of Women Within Occupations? *KZfSS Kölner Zeitschrift für Soziologie und Sozialpsychologie* 67:217–242.
- Hora, Matthew T. 2020. Hiring as cultural gatekeeping into occupational communities: implications for higher education and student employability. *Higher Education* 79: 307–324
- Huppatz, Kate. 2012. *Gender capital at work: Intersections of femininity, masculinity, class and occupation*: Springer.
- Hutter, Christian, and Enzo Weber. 2017. Labour market effects of wage inequality and skill-biased technical change in Germany. *IAB-Discussion Paper* 05/2017.
- International Labour Office. 2012. *International Standard Classification of Occupations 2008 (ISCO-08): Structure, group definitions and correspondence tables*. International Labour Office.
- Janietz, Christoph, and Thijs Bol. 2020. Occupations, Organizations, and the Structure of Wage Inequality in the Netherlands. *Research in Social Stratification and Mobility*:100468.
- Johnson, Sheena, Cary Cooper, Sue Cartwright, Ian Donald, Paul Taylor and Clare Millet. 2005. The experience of work-related stress across occupations. *Journal of Managerial Psychology* 20:178–187.
- Jonsson, Jan O., David B. Grusky, Matthew Di Carlo, Reinhard Pollak and Mary C. Brinton. 2009. Micro-class mobility: Social reproduction in four countries. *American Journal of Sociology* 114:977–1036.
- Kambourov, Gueorgui, and Iourii Manovskii. 2009. Occupational Specificity OF Human Capital. *International Economic Review* 50:63–115.
- Kampelmann, Stephan, and François Rycx. 2012. Are occupations paid what they are worth? An econometric study of occupational wage inequality and productivity. *De Economist* 160:257–287.
- Kim, ChangHwan, Christopher R. Tamborini and Arthur Sakamoto. 2018. The Sources of Life Chances: Does Education, Class Category, Occupation, or Short-Term Earnings Predict 20-Year Long-Term Earnings? *Sociological Science* 5:206–233.
- Kleiner, Morris M., and Alan B. Krueger. 2013. Analyzing the Extent and Influence of Occupational Licensing on the Labor Market. *Journal of Labor Economics* 31:173–202.
- Koumenta, Maria, Amy Humphris, Morris M. Kleiner and Mario Pagliero. 2014. *Occupational regulation in the EU and UK: prevalence and labour market impacts*. Queen Mary University of London.
- Kreyenfeld, Michaela, and Dirk Konietzka. 2002. The performance of migrants in occupational labour markets. *European societies* 4:53–78.
- Kricheli-Katz, Tamar. 2019. Us versus Them: The Responses of Managers to the Feminization of High-Status Occupations. *Socius: Sociological Research for a Dynamic World* 5:1–15
- Law, Marc T., and Mindy S. Marks. 2013. From certification to licensure: evidence from registered and practical nurses in the United States, 1950–1970. *The European Journal of Comparative Economics* 10:177.
- Leuze, Kathrin, and Susanne Strauß. 2016. Why do occupations dominated by women pay less? graduates. How ‘female-typical’ work tasks and working-time arrangements affect the gender wage gap among higher education. *Work, Employment & Society* 30:802–820.

- Liu, Yujia, and David B. Grusky. 2013. The Payoff to Skill in the Third Industrial Revolution. *American Journal of Sociology* 118:1330–1374.
- Matthes, B., and B. Vicari. 2019. Arbeitsmarktorientierte Berufsforschung. In *Handbuch Berufsbildung*. Living reference work, eds. Rolf Arnold, Antonius Lipsmeier and Matthias Rohs, 683–694. Wiesbaden: VS Verlag für Sozialwissenschaften.
- Mayer, Karl U., Daniela Grunow and Natalie Nitsche. 2010. Mythos Flexibilisierung? Wie instabil sind Berufsbiographien wirklich und als wie instabil werden sie wahrgenommen? *Kölner Zeitschrift für Soziologie und Sozialpsychologie* 62:369–402.
- Menze, L. 2017. Horizontale und vertikale Adäquanz im Anschluss an die betriebliche Ausbildung in Deutschland. *Kölner Zeitschrift für Soziologie und Sozialpsychologie* 69:79–107.
- Michelson, Ethan. 2013. Women in the Legal Profession, 1970–2010. A Study of the Global Supply of Lawyers. *Ind. J. Global Legal Stud.* 20:1071.
- Mincer, Jacob A. 1974. Schooling, Experience, and Earnings. *NBER Books*.
- Morgan, Stephen L., Dafna Gelbgiser and Kim A. Weeden. 2013. Feeding the pipeline: Gender, occupational plans, and college major selection. *Social science research* 42:989–1005.
- Mouw, Ted, and Arne L. Kalleberg. 2010. Occupations and the Structure of Wage Inequality in the United States, 1980s to 2000s. *American Sociological Review* 75:402–431.
- Murphy, Raymond. 1988. *Social closure. The theory of monopolization and exclusion*. Oxford University Press.
- Nawakitphaitoon, Kritkorn, and Russell Ormiston. 2015. Occupational human capital and earnings losses of displaced workers. Does the degree of similarity between pre-and post-displacement occupations matter? *Journal for Labour Market Research* 48(1):57–73.
- Nordin, Martin, Inga Persson and Dan-Olof Rooth. 2010. Education–occupation mismatch: Is there an income penalty? *Economics of Education Review* 29:1047–1059.
- Ochsenfeld, Fabian. 2014. Why Do Women’s Fields of Study Pay Less? A Test of Devaluation, Human Capital, and Gender Role Theory. *European Sociological Review* 30:536–548.
- Ochsenfeld, Fabian. 2018. The Relational Nature of Employment Dualization: Evidence from Subcontracting Establishments. *European Sociological Review* 34:304–318.
- Oesch, Daniel. 2013. *Occupational change in Europe: how technology and education transform the job structure*. Oxford University Press.
- Oesch, Daniel, and Jorge R. Menes. 2011. Upgrading or polarization? Occupational change in Britain, Germany, Spain and Switzerland, 1990–2008. *Socio-Economic Review* 9:503–531.
- Oesch, Daniel, and Giorgio Piccitto. 2019. The Polarization Myth: Occupational Upgrading in Germany, Spain, Sweden, and the UK, 1992–2015. *Work and Occupations* 46:441–469.
- Pagliari, Mario. 2011. What is the objective of professional licensing? Evidence from the US market for lawyers. *International Journal of Industrial Organization* 29:473–483.
- Pagliari, Mario. 2019. Occupational Licensing in the EU. Protecting Consumers or Limiting Competition? *Review of Industrial Organization* 55:137–153
- Petersen, Trond, Ishak Saporta and Marc-David L. Seidel. 2000. Offering a job: Meritocracy and social networks. *American Journal of Sociology* 106:763–816.
- Redbird, Beth. 2017. The New Closed Shop? The Economic and Structural Effects of Occupational Licensure. *American Sociological Review* 82: 600–624
- Reichelt, M., and M. Abraham. 2017. Occupational and regional mobility as substitutes. A new approach to understanding job changes and wage inequality. *Social Forces* 95(4):1399–1426.
- Rivera, Lauren A. 2012. Hiring as Cultural Matching. *American Sociological Review* 77:999–1022.
- Rohrbach-Schmidt, Daniela. 2019. Putting Tasks to the Test: The Case of Germany. *Social Inclusion* 7:122.
- Rohrbach-Schmidt, Daniela, and Michael Tiemann. 2011. Mismatching and job tasks in Germany–rising over-qualification through polarization? *Empirical research in vocational education and training* 3:39–53.
- Rostam-Afschar, Davud. 2014. Entry regulation and entrepreneurship: a natural experiment in German craftsmanship. *Empirical Economics* 47:1067–1101.
- Rostam-Afschar, Davud, and Kristina Strohmaier. 2019. Does Regulation Trade Off Quality against Inequality? The Case of German Architects and Construction Engineers. *British Journal of Industrial Relations* 57:870–893.
- Salvatori, Andrea. 2018. The anatomy of job polarisation in the UK. *Journal for Labour Market Research* 52:8.
- Santiago, Paulo. 2002. Teacher Demand and Supply: Improving teaching quality and addressing teacher shortages. A literature review and a conceptual framework for future work. *OECD Education Working Paper*:1–131.

- Schiller, Bradley R. 1994. Below-minimum-wage workers: Implications for minimum-wage models. *Quarterly Review of Economics and Finance* 34:131–144.
- Sengenberger, Werner. 1987. *Struktur und Funktionsweise von Arbeitsmärkten. Die Bundesrepublik Deutschland im internationalen Vergleich*. Frankfurt/Main: Campus-Verl.
- Shockey, Taylor M., and Anne G. Wheaton. 2017. Short Sleep Duration by Occupation Group—29 States, 2013–2014. *MMWR. Morbidity and Mortality Weekly Report* 66:207–213.
- Sinclair, Samantha, Artur Nilsson and Elmedina Cederskär. 2019. Explaining gender-typed educational choice in adolescence: The role of social identity, self-concept, goals, grades, and interests. *Journal of Vocational Behavior* 110:54–71.
- Skedinger, Per. 2006. Minimum wages and employment in Swedish hotels and restaurants. *European Association of Labour Economists 21st annual conference*, Tallinn, Estonia, 10–12 September 2009 13:259–290.
- Sørensen, Aage B. 1977. The structure of inequality and the process of attainment. *American Sociological Review*:965–978.
- Sørensen, Aage B. 1996. The structural basis of social inequality. *American Journal of Sociology* 101:1333–1365.
- Sørensen, Aage B., and Arne L. Kalleberg. 1977. *An Outline of a Theory of the Matching of Persons to Jobs*. Institute for Research on Poverty, University of Wisconsin-Madison.
- Spitz-Oener, Alexandra. 2006. Technical Change, Job Tasks, and Rising Educational Demands: Looking outside the Wage Structure. *Journal of Labor Economics* 24:235–270.
- Stiglitz, Joseph E. 1975. The theory of “screening”, education, and the distribution of income. *The American Economic Review* 65:283–300.
- Stuth, Stefan. 2017. *Closing in on Closure. Occupational Closure and Temporary Employment in Germany*, vol. 1. Baden-Baden: Nomos.
- Tholen, Gerbrand. 2019. Degree power: educational credentialism within three skilled occupations. *British Journal of Sociology of Education* 7:1–16.
- Thurow, Lester C. 1975. *Generating inequality*. New York: Basic books.
- Weeden, Kim A. 2002. Why do some occupations pay more than others? Social closure and earnings inequality in the United States. *American Journal of Sociology* 108:55–101.
- Weeden, Kim A., and David B. Grusky. 2005. The Case for a New Class Map. *American Journal of Sociology* 111:141–212.
- Weeden, Kim A., Youngjoo Cha and Mauricio Bucca. 2016. Long work hours, part-time work, and trends in the gender gap in pay, the motherhood wage penalty, and the fatherhood wage premium. *The Russell Sage Foundation Journal of the Social Sciences* 2:71–102.
- van de Werfhorst, Herman G. 2011. Skills, positional good or social closure? The role of education across structural-institutional labour market settings. *Journal of Education and Work* 24:521–548.
- Williams, Mark. 2013. Occupations and British Wage Inequality, 1970s–2000s. *European Sociological Review* 29:841–857.
- Witte, Nils, and Andreas Haupt. 2019. Is Occupational Licensing More Beneficial for Women than for Men? The Case of Germany, 1993/2015. *European Sociological Review* 24:633.

Andreas Haupt Dr. phil., 1983. Ass. Prof. (Ak. Rat) at the Karlsruhe Institute of Technology. Fields of research: social inequality, labor market and occupational research, methodological research. Publications: Is occupational licensing more beneficial for women? The case of Germany, 1993 to 2015. *European Sociological Review*, 2019 (with N. Witte); The Long Road to Economic Independence of German Women, 1973 to 2011. *Socius* 2019; Erhöhen Berufliche Lizenzen Verdienste und die Verdienungleichheit? *Zeitschrift für Soziologie* 45, 2016.

Christian Ebner 1978, Dr. phil., Professor of Sociology with a focus on work and organization, Technische Universität Braunschweig. Fields of research: labor market inequality, occupational training and further education, transformation of the workplace, occupations and working conditions. Publications: Weiterbilden und Weiterkommen? Non-formale berufliche Weiterbildung und Arbeitsmarktmobilität in Deutschland, *Kölner Zeitschrift für Soziologie und Sozialpsychologie* 70, 2018 (with M. Ehlert); Social distance and wage inequalities for immigrants in Switzerland, *Work, Employment and Society* 30, 2016 (with M. Helbling); Labour market developments and their significance for VET in Germany: an overview, *Research in Comparative & International Education* 10, 2015.