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# Turf or Variety: Task Structure as a Source of Organizational Inequality

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## Abstract

What explains pay inequality among co-workers? Theories of organizational influence on inequality emphasize the effects of formal hierarchy. But restructuring, firm flattening and individualized pay-setting have challenged the relevance of these structuralist theories. In this article, I propose a new organizational theory of differences in pay, focused on task structure and the horizontal specialization across jobs. When organizations specialize jobs, they reduce the variety of tasks performed by some workers. But in doing so they leave exclusive job turf to co-workers, who capture the learning and discretion associated with performing a given task. The division of labor thus erodes pay premiums for some workers while advantaging others through job turf. I test this theory with linked employer-employee panel data that include rare annual reporting on work tasks. Results show that reducing task variety lowers worker earnings, while increasing job turf raises earnings. When organizations reduce task variety for some workers, they increase job turf for others. Without assuming fixed job hierarchies and pay rates, interdependencies in organizational task allocation yield unequal pay premiums among co-workers.

**Word count:** 14656

**Keywords:** division of labor, work, organizations, specialization, earnings, inequality

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Why are co-workers in the same organization paid differently? Market theories of inequality predict that wages vary because different work tasks require worker skills of varying scarcity. Consistent with human capital variation driving pay differences, economy-wide data show that fixed worker attributes account for 65 percent of within-firm inequality (Song, Price, Guvenen, Bloom, and von Wachter 2018). Organizational research, in contrast, challenges the assumption that co-workers affect each other only when aggregated into labor market supply. This research explores the non-price interdependencies that intertwine co-workers' fates. But typically interdependence limits, rather than heightens, local pay differences. Fairness concerns and workgroup solidarity compress pay inequality (Cobb and Stevens 2017; Wilmers 2019), particularly for horizontal comparisons among peers (Cullen and Perez-Truglia 2018; Dube, Giuliano, and Leonard 2018). Similarly, research on team collaboration and peer effects finds that proximity to high-ability peers pulls up productivity, further muting pay differences between co-workers (Cornelissen, Dustmann, and Schönberg 2017; Mas and Moretti 2009). Insofar as organizations are collaborative and normative communities, they mitigate rather than exacerbate market-driven pay differences (Cobb 2016).

Organizational theories yielding inequality focus not on norms or markets, but on formal organizational hierarchies. Studies of vacancy chain mobility show that promotions across jobs, and therefore pay increases, depend in part on when and whether superiors vacate their position (Rosenfeld 1992). Analogously, tournament theory predicts that initially lower-paid entry-level workers compete for a promotion, so the likelihood of one worker's promotion declines as the performance of her colleagues improves (Connelly, Tihanyi, Crook, and Gangloff 2014; Lazear and Rosen 1981). Both tournaments and vacancy chains can generate pay differences over and above those predicted by labor market prices. But these processes presuppose a fixed structure of hierarchically organized jobs. To drive pay differences, they also require pay assigned to job title without reference to the value of a worker-job match. The organization must harbor a clear job and pay structure, constraining worker opportunity. In an era when organizational restructuring has dismantled internal labor markets (Cappelli 2001; Hollister and Smith 2014) and when pay is increasingly set by individual performance rather than job title alone (Lemieux, MacLeod, and Parent 2009), the relevance of hierarchy theories for explaining organizational pay differences has eroded. As a result, the research program that explores worker interdependencies as a source of within-organization inequality has faltered (Baron and Bielby 1980; Tilly 1998).

In this article, I reformulate this agenda in organizational research and propose two new axes of worker interdependency that can explain pay inequality inside organizations, without the strong assumption of a fixed job hierarchy that limits prior theory. First, I note that allocating a fixed set of tasks imposes systemic interdependency across co-workers' task assignments. Just as workers move across a set of jobs in an internal labor market, tasks move across a set of co-workers. Attempts to reduce the variety of tasks that some workers perform tend to increase the uniqueness of the tasks performed by others. Second, I build on prior organizational theory (Burt 1997), to argue that the value of workers' on-the-job learning tends to increase with uniqueness. Pay does not depend only on the scarcity of general skills in the labor market writ large, but also on scarcity of specific skills in the organization itself. Together, these two claims reveal a neglected channel through which co-workers' interdependency drives within-organization pay differences.

Specifically, I call these constraints task structure—or the allocation of work tasks across jobs—rather than task content—or the difficulty or complexity of a given work task. Organizations develop more or less specialized job responsibilities, which determine the idiosyncratic value of each worker-employer match. When task overlap among co-workers diminishes through specialization, task-specific skill becomes the province of a dwindling number of workers in the organization. Insofar as a nodal worker can capture the learning associated with her position, it heightens an employer's risk of hold-up by the worker. Pay premiums thus depend not only on the task a worker performs, but also on how distinct that task is from those performed by co-workers. I use the term *job turf* to capture the phenomenon in which a given worker performs tasks that are unique relative to those conducted by her co-workers. Employers can erode job turf by dispersing employees more evenly across tasks. But, as jobs shift from requiring a single task to multiple different tasks, their skill requirements increase accordingly. Instead, organizations often reduce task variety to expose a position to a broader set of potential applicants. In doing so, some task areas become turf, commanding higher earnings, while other jobs lose task variety and are exposed to increased competition. Job configurations are thus interdependent such that the same process that increases exposure to labor market competitors for some workers generates job turf for other workers. As a result, task structure generates within-organization pay differences.

To test this theory, I draw on data covering the representatives, managers and clerical workers directly employed by U.S. labor unions from 2005 to 2017. Because unions are required to report

on the actual work activities performed by each of their employees, they offer a unique opportunity with linked employer-employee data to measure the allocation of tasks across jobs. I validate unions' employee activity reports as reliable indicators of work tasks by conducting a survey of union representatives and by linking the reports to hand-coded descriptions from online job postings. Labor unions, like other white collar office workplaces, employ staff for a bifurcated set of activities: clerical office work and strategic and member (or client) services. These disparate task types make union employment a strategic setting in which to study the allocation of tasks across jobs. I measure task variety by a worker performing a more or less diverse set of tasks. Organizational job turf varies with the number of other co-workers performing a task. The data allow these two facets of divided labor—turf and task variety—to be distinguished in an analytic context with controls for task content, for unobserved worker-organization-job title heterogeneity, for worker tenure and for year-to-year variation in workplace-wide pay policies and in external labor market conditions. In additional analyses, I find evidence against a series of alternative explanations for the results: that employers positively select workers into tasks as they learn about worker quality; that work intensification or vertical task distinctions explain these patterns; or that positive earnings effects are driven by simultaneous workplace productivity changes.

The analysis establishes that organizations generate an unequal distribution of pay premiums as they assign more or less distinctive sets of work tasks across workers. In doing so, it reveals a core tradeoff in the organizational division of labor. When organizations specialize jobs, they tend to reduce the variety of tasks required for some jobs. But this process leaves other jobs with valuable task turf. The jobs covering fewer tasks have a weaker bargaining position, while those covering tasks more exclusively have a stronger position. The organizational division of labor, long characterized as a force eroding workers' earnings and bargaining power ([Braverman 1974](#)), in fact yields inequality between jobs losing variety and jobs gaining turf. In the discussion section, I consider implications of this theory for organizational research on job construction, career specialization, sources of worker bargaining power, and economic stratification.

## Pay Inequality within Organizations

A prominent stream of theory identifies hierarchical work organizations as a basic source of inequality (Baron 1984; Pfeffer and Langton 1988). Organizations indeed harbor substantial inequality within their boundaries (Shin 2014). They array employees across hierarchical levels, where positions in those levels strongly correlate with pay (Hedström 1991). Pay may thus be determined in part by the constraints of fixed job hierarchy, rather than by a market for skill alone (Kalleberg and Buren 1994). As noted above, workers move across a given job structure through vacancy chains and promotion tournaments. Building on these ideas, a research program has explored ways that hierarchical organizations generate economic inequality among their employees, over and above inequality implied by competitive market wages (Baron and Bielby 1980; Tilly 1998).

There are two key limitations to this structuralist approach to explaining within-organization inequality. First, it is difficult to distinguish pure effects of organizational position from the content of work tasks and their skill requirements. Managers performing more complex tasks than subordinates likely receive higher pay as necessary recompense for higher skill, rather than due to their position per se (Garicano and Rossi-Hansberg 2006; Autor and Handel 2013). If technological change raises the stakes of CEO decisions, then CEO compensation can rise due to market forces, rather than organizational changes (Frydman and Papanikolaou 2018). Research on firm growth and production hierarchies finds that while inequality increases as firm hierarchies grow, this change is attributable to a changing composition of employees (Caliendo, Monte, and Rossi-Hansberg 2015). What look like structurally determined differences in pay may be a combination of heterogeneity in task content and market demand for skill.

Second, several lines of research challenge the premise that organizations harbor fixed job structures across which employees move. Jobs are cobbled together, constituted and reconstituted out of underlying work tasks (Cohen 2013) and even in a highly formalized job structure many jobs are “idiosyncratic” to the workers occupying them (Miner 1987). During the course of a work project, tasks are assigned and reassigned and reformulated (Strauss 1985). In some settings, task allocation varies with the fortunes of dueling professions, locked in conflict over task jurisdictions (Abbott 1988). Recent changes in employment systems, from organizational restructuring (Dencker and Fang 2016) and the decline of internal labor markets (Cappelli 2001; Hollister and Smith 2014) to

flattening firm hierarchies (Rajan and Wulf 2006) have further challenged the premise of a fixed job structure. Moreover, for job structure to generate pay differences, pay needs to be strongly and strictly attached to job title. But, the rise of performance-based compensation and individualized pay-setting pry apart this previously plausible relationship (Lemieux, MacLeod, and Parent 2009; Hanley 2011).

Extant organizational theory of pay differences thus faces two limitations. Differences in pay by task content are often explicable by labor market supply and demand. Differences due to position in job structure alone require fixed positions and pay. Instead of task content and markets or job structure and hierarchy, I focus on task structure. Specifically, I propose a new theory of organizational pay inequality that focuses on the allocation of horizontally distinct work tasks into jobs. The division of labor is an even more primitive aspect of organization than hierarchy: organizations nearly always employ agents to engage in multiple, distinct tasks. Some allocations of these tasks can insulate workers from the threat of replacement by both external applicants and by co-workers. Moreover, interdependencies in job construction yield within-organization variation in the extent of such insulation, driving within-organization pay differences. This theory extends prior research on organizational sources of pay inequality by rigorously distinguishing between task content and structural position and by building in dynamic job assembly (rather than assuming a fixed job structure).

## **Division of Labor and Organizational Pay Premiums**

How does task structure affect worker earnings? In the following section, I first discuss how the division of labor or specialization process relates to task variety to job turf. I then consider why positions in task structure may affect individual workers' earnings, over and above effects of task content.

### **Specialization Trades Off Job Turf and Task Variety**

Job-level specialization has two dimensions: a worker can gain job turf by doing a unique task relative to a co-worker or can lose task variety by specializing away from doing several tasks toward doing a single one. Unlike prior research, chiefly in labor economics, that focuses on task *content*, these

distinctions focus on task *structure*. Organization-specific task structure effects are supplementary to labor market-governed prices for task content. For example, if a job loses task variety, but through upskilling becomes dominated entirely by a highly skilled task, then earnings could increase if the task content change trumps the task structure change. To clarify this distinction, Table 1 gives examples across poles on each task structure axis across high education (in a hospital) and low education (in a manufacturing facility) jobs. Single-task, redundant jobs range from janitors to breast surgeons. In both cases, essentially one task is performed (cleaning and surgery). And in both cases, organizations employ multiple employees who fill essentially the same job. Of course, the number of breast surgeons varies with hospital size and specialty, but large hospitals employ a whole team of surgeons to implement common surgical interventions against breast cancer. In contrast, even a large hospital may employ only a single pediatric neurosurgeon. Likewise, unlike janitors in a factory, an assembly worker is often the sole person performing a given, specialized task on the line. These examples demonstrate the distinction between task content and task structure: notwithstanding the stark differences in educational requirements and task content separating janitors and breast surgeons, they fall in analogous positions in task structure.

[Table 1 about here.]

Table 1 also shows examples of jobs that have both high task variety and high job turf. Pediatric rheumatologists specialize in a patient population and relatively rare disease area and are thus rarely surrounded by other colleagues specialized in the same practice area. This role stands in contrast to general practitioners, who typically float across clients and projects as directed. But, pediatric rheumatologists may also perform multiple tasks, ranging from diagnosis to treatment involving anything from prescribing medication to physical therapy to joint injections. This multi-tasking stands in contrast to surgeons, who perform only a single, medically crucial, task. Likewise, an electrician in an assembly plant troubleshoots and responds to non-routine electrical issues as they arise, in contrast to an assembly line worker, who may carry out the same monotonous task day in and day out. Except in the largest manufacturing facilities, there will only be a handful of electricians (and other craft and maintenance workers), who learn the idiosyncrasies of a plant's power system and may not be easily replaced. The task content and the complexity or routine nature of a given task—focused on in labor economics—can thus be distinguished conceptually from task structure,



or the task variety and turf available in a given job.

The examples in Table 1 provide static comparisons between jobs within a given workplace. But, these task structure characteristics are in fact two sides of a common job specialization process. When a workplace division of labor increases specialization, job turf increases while task variety decreases. Panel (a) of Figure 1 provides a simple example in an organization with three workers and a distribution of two types of tasks to divide among them. The organization starts with one worker doing the single majority task and the other two workers spending half of their time on that same task, but spending the other half on the second task. When this organization divides labor, it reduces job variety for both Worker 2 and Worker 3. However, the consequences of this division for job turf are different across the workers. Worker 2 ends up with a single task and no difference in job turf. Worker 3 also has less task variety, but is now the sole worker performing one of the organization’s two tasks. When tasks are reallocated, shifting toward the organization’s minority task yields increased job turf.

[Figure 1 about here.]

However, increases in job turf for a given job do not always carry simultaneous reductions in task variety. Panel (b) illustrates an example where an organization again shifts toward more specialized task structure, but where the second task is a smaller share of total work than in Panel (a). Worker 2, as before, loses task variety without any compensating increase in job turf. Worker 3, as before, gains more unique job turf. But, in this example, Worker 3’s task set becomes a more even split between the two tasks and loses no task variety. In both of these examples, decreasing task variety for one worker increases job turf for another. The worker newly benefiting from job turf may or may not also face a countervailing decrease in task variety.<sup>1</sup>

**Hypothesis 1.** *Job turf for a worker increases as a byproduct of diminished task variety among her co-workers.*

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<sup>1</sup>For simplicity, these examples assume that employment levels and the task set are fixed. Relaxing that assumption introduces more degrees of freedom in the relationship between changes in job turf and changes in co-workers’ task variety. Task variety can decrease due to the disappearance of a particular task, perhaps due to technological replacement, shifting product offerings or outsourcing. Job turf can decline due to an increase in total organizational employment, insofar as a task area formerly cornered by a single employee is now performed by two workers. In the empirical analysis I consider the robustness of the relationship between task variety and job turf across each of these possible channels of task reallocation.

This interdependency between co-workers’ task assignments provides one reason employers allow turf to persist. If job turf lets certain workers bargain for higher wages, employers will have increased labor costs and must weather perceived violation of fairness norms. Yet employers may choose to bear this cost if benefits from reducing task variety for workers doing the majority task counterbalance costs of allowing job turf for workers in the minority tasks. Note that this interdependency across jobs does not presuppose actual teamwork or even interdependent task performance. Rather, it is an ecological interdependency, in which the reallocation of a fixed set of work tasks affects multiple jobs. If one job loses variety, another increases its turf.

### **Task Structure Affects Pay Bargaining**

How does this two-sided workplace job specialization process affect workers’ earnings? Incumbent workers and their employer bargain over the surplus that comes from a continued employment relationship (Stole and Zwiebel 1996). This surplus is determined by (1) the lost value for the organization if a worker exits and (2) each worker’s outside option.<sup>2</sup> The worker’s outside option is given by the outside labor market value of her skill (and the risk of foregone wages through unemployment). This outside option is chiefly determined by supply and demand in the broader labor market and not by organizational sources. For example, as skill-biased technological change and economic globalization chipped away at underlying demand for routine tasks, earnings stagnated for the middle-skill workers that previously performed those tasks (Autor, Dorn, and Hanson 2013; Autor and Dorn 2013). Pay inequality due to such shifts is attributable to labor market, not organizational, requirements.

Organization-side factors like task structure matter by affecting the size and distribution of worker-employer match surplus. First, when the worker and the organization are dividing some surplus arising from their continued match, the magnitude of the surplus is determined by the cost to the employer of replacing the worker. This cost will hinge on the task-specific knowledge accumulated by the worker and on the difficulty of replacing the worker with an external candidate.

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<sup>2</sup>Formally, in an organization with  $n$  workers, a worker’s maximum pay premium above her outside option wage  $w$  is defined by the surplus for an organization associated with employing the worker:

$$w(n) - w = \pi(n) - \pi(n - 1).$$

$\pi(n)$  is the organization’s profits if the worker stays and  $\pi(n - 1)$  is the organization’s profits if bargaining breaks down and the worker must be replaced. The costs associated with the worker’s exit will vary according to the depth of the labor market and the firm-specific knowledge required to perform job tasks at the level of the incumbent worker.

Second, beyond this match premium, organizations can also change a worker’s outside option by assigning tasks that either increase a worker’s skill or reveal underlying ability of the worker to other employers (Waldman 1984; Acemoglu and Pischke 1998). It is through these organization-side effects that both dimensions of task structure matter for worker earnings.

Specifically, job turf affects pay bargaining through the narrow distribution of on-the-job learning (Gibbons and Waldman 2004). Prior research in organizational theory has found that when a manager occupies a unique job social capital is more valuable than when she is one of multiple occupants of a job type (Burt 1997). I extend this logic below the fixed job structure to tasks and note that learning associated with task performance can be more or less broadly distributed. If a worker is the sole performer of a given task area in a workplace, then she is the sole recipient of any learning related to that task. If learning opportunities associated with job turf are rare and productive not only for a given workplace, but also for external employers, then assignment to job turf could also raise a worker’s outside option. Several case studies suggest that job turf can strengthen workers’ bargaining position. Critics of team concept work in automobile factories argue that notwithstanding the upskilling effect of multitasking, these initiatives could nonetheless lower worker bargaining power (Rinehart, Huxley, and Robertson 1997; Vallas 2003). Job rotation increased “Interchangeability, meaning that workers are required or induced (through “pay-for-knowledge”) to be capable of doing several jobs.” (Parker and Slaughter 1988, 5). Likewise, culinary unions in the early 20<sup>th</sup> century pushed for occupational specialization among their members and dividing locals by food preparation, cleaning and table service (Cobble 1991, 121-122). At the other end of the earnings distribution, in professional services firms, client relationships form a quintessential type of specific learning, whereby an individual lawyer can monopolize a given client relationship (Coates, DeStefano, Nanda, and Wilkins 2011). In general, workers with job turf successfully bargain for higher earnings.

**Hypothesis 2.** *Increased job turf increases worker earnings.*

In contrast, reducing task variety tends to decrease an incumbent worker’s pay. A job that previously required multiple skills corresponding to different tasks could, upon reduction in task variety, be performed by a larger range of potential applicants. Likewise, multi-tasking signals worker versatility across a broader range of potential jobs, improving the outside option (Merluzzi and Phillips 2016). Several studies find that task variety raises earnings. First, workplace-level data

suggest that job rotation and multitasking is associated with higher wages (Osterman 2006; Caroli and Van Reenen 2001). Second, worker-level German survey data show that doing multiple tasks at work is associated with higher earnings (Snower and Goerlich 2013). Third, several case studies of clerical office work find a link between task variety and higher earnings (Rogers 1999; Glenn and Feldberg 1977). For example, the introduction of new imaging technology at a bank led to the subdivision of jobs in one department, while multitasking increased in another department. Earnings increased in the latter department while stagnating in the former (Autor, Levy, and Murnane 2002). None of these prior studies can rule out worker sorting as a driver of the apparent earnings effects associated with task variety and multitasking. Nonetheless, they suggest that task variety raises worker earnings.

**Hypothesis 3.** *Increased task variety increases worker earnings.*

Historical studies of industrial work in the late 19<sup>th</sup> and early 20<sup>th</sup> century illustrate the process by which task structure changes affect worker earnings. Until the imposition of scientific management, iron rollers worked under egalitarian work allocation rules “which made each group of workers average very similar earnings” (Montgomery 1980, 13). But the rise of Taylorism in the early twentieth century left a bifurcated job structure of workers and managers (Nelson 1996). Scientific management sought a “separation of hand and brain” by specializing the work of planning and execution across different types of employees (Braverman 1974, 87). Corroborating quantitative research on the manufacturing industry wage structure of the late 19<sup>th</sup> century attributes rising inequality between skill groups to the decline of craft production and the concentration of workers in large factories (Atak, Bateman, and Margo 2004). While unskilled laborers had less task variety than their craftsmen forebears, a smaller number of managers enjoyed a greater monopoly over planning tasks than even master iron rollers or machinists would have previously enjoyed.<sup>3</sup>

## Empirical Setting: Unions as Employers

Testing these hypotheses requires data on configurations of work tasks within organizations. Unfortunately, such data are rarely collected. Previous research on tasks and earnings has relied primarily

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<sup>3</sup>In this historical case, the underlying content of the job turf tasks was also more complex than those performed in the reduced task variety, manual work. In the empirical analysis below, I control for task content, worker ability and skill-specific local labor market demand, to rigorously distinguish task structure from task content effects.

on the Dictionary of Occupational Titles and O\*NET, which include only occupation-level data (Autor and Dorn 2013). One survey asked individual respondents about work tasks, but was a one-time cross-sectional study (Autor and Handel 2013). Further, neither of these data sources nest employees in organizations, which means job turf cannot be identified. Several case studies have carefully measured work tasks, but were confined to analyzing single organizations (Fernandez 2001; Autor, Levy, and Murnane 2002).

The current article tackles these data limitations by drawing on administrative records reported by U.S. labor unions. The data cover individuals employed together in each labor union, which reveals shifting configurations of tasks across jobs within workplaces. The data are also structured as panels on employers and workers, which reduces the risk of unobserved, time-invariant attributes biasing estimates of earnings effects.

These improvements in data quality come at a cost of representativeness: unions are membership organizations with distinctive employment practices. But this distinctiveness can be exaggerated. 90% of national unions hired staff with no experience working in a union and 80% saw college degrees for staff as important (Clark, Gilbert, Gray, and Solomon 1998). Unions have also been increasingly subject to economic pressures affecting other U.S. employers (Dunlop 1990). Like the manufacturing firms that were their longtime bastion, unions have faced secular decline, which has brought mergers (Moody 2009) and new management styles (Voss and Sherman 2000). Like other business and professional services providers, unions have seen their operations reshaped by information technology (Shostak 2001). Most importantly for this study, unions, like other white collar office workplaces, face the challenge of allocating interactional-strategic work and routine office tasks across jobs within a single workplace.

For unions, interactional work is mainly conducted by union representatives, organizers and business agents (Dunlop 1990). These employees interact with union members and shop stewards; negotiate collective bargaining agreements; and develop strategy for electoral and union recognition campaigns. They exemplify the social-interactional, cognitive, and non-routine work that has been immune to technological replacement and offshoring (Deming 2017). In contrast, clerical tasks include bookkeeping, taking notes at meetings, processing membership applications, grievance forms and union expenditures, and performing other administrative work. These tasks are of the routine type vulnerable to technological change: information technology has substantially reduced the U.S.

employment share of clerical occupations (Autor and Dorn 2013). Below, I assess the similarity of earnings trends in these union-specific tasks to trends in the economy overall.

## Data

Unions disclose financial and employment information to the Department of Labor’s Office of Labor-Management Standards (OLMS) (Wilmsers 2017). Starting in 2005, unions with over \$250,000 in annual revenue were required to itemize the share of each of their employees’ work time that goes to different activities. These linked employer-employee data allow analysis of the relationship between task structure and earnings. The analytical sample is a 13-year panel ending in 2017, including 5,400 labor unions and 136,000 employees of unions. The data are at the worker-year level, and the activities measures are reported annually, even for workers who do not change job titles. The Appendix discusses the data and sample restrictions in detail. Table 2 provides descriptive statistics on the sample and variables discussed below. Table 3 provides a correlation matrix for the variables.

[Table 2 about here.]

The dependent variable in the analysis is logged employee earnings, defined as gross salary payments to each individual employee and adjusted for inflation. The variance of logged earnings in the sample is 0.39, around the mean within-industry variance of wages in the Current Population Survey Outgoing Rotation Group during the same time period.

I construct two measures of the employee-level division of labor, both based on union-reported allocations of employee time across 5 activity categories: representational, administrative, general overhead, political and contributions (or donations). Reporters are constrained to categorize paid work time exhaustively in the reports. Representational tasks (54%), general overhead (25%) and administrative tasks (16%) constitute the bulk of work activity, while political (5%) and contributions (1%) are much less common.

The OLMS instructions define representational and political activities as primarily interactional and strategic, while administrative and general overhead activities cover more clerical work. Unfortunately, the instructions include some ambiguity. Representational activities include tasks “associated with preparation for, and participation in, the negotiation of collective bargaining agreements and

Table 1: Correlation Matrix

	log Salary	Task Variety	Job Turf	Share Pol.	Share Rep.	Share Contrib.	Share Ovrhd.	Share Admin.	Ten- ure	Exper- ience	log Empl.	log Memb.	Co-w.'s Variety	HHI
log(Annual Salary)	1.00													
Task Variety	0.25	1.00												
Job Turf	0.08	0.20	1.00											
Share Pol. Tasks	0.02	0.13	0.15	1.00										
Share Rep. Tasks	0.15	0.02	-0.21	-0.21	1.00									
Share Contrib. Tasks	0.02	0.13	0.12	0.01	-0.07	1.00								
Share Overhd. Tasks	-0.16	-0.19	0.10	-0.14	-0.66	-0.04	1.00							
Share Admin. Tasks	-0.04	0.11	0.08	-0.08	-0.47	-0.02	-0.22	1.00						
Tenure	0.31	0.10	0.08	-0.02	-0.03	0.00	0.01	0.03	1.00					
Experience	0.29	0.11	0.05	-0.01	0.04	-0.00	-0.05	0.01	0.73	1.00				
log(Assets)	0.03	-0.00	-0.02	0.01	-0.01	0.01	0.01	-0.01	0.14	0.11	1.00			
log(Union Employ.)	-0.08	-0.04	-0.24	0.00	0.02	-0.00	-0.01	-0.03	-0.13	-0.09	0.12	1.00		
log(Union Memb.)	0.01	-0.00	-0.05	0.00	0.00	-0.00	-0.00	-0.00	-0.05	-0.03	0.16	0.28	1.00	
Co-work.'s Variety	-0.06	0.03	-0.09	0.01	-0.07	0.01	0.06	0.02	-0.03	-0.03	-0.01	-0.13	-0.01	1.00
HHI	0.00	-0.01	0.00	-0.00	0.00	-0.00	-0.00	-0.00	0.04	0.03	0.07	0.02	0.00	-0.03

Source: OLMS.

the administration and enforcement of [these] agreements . . . [and] with efforts to become the exclusive bargaining representative for any unit of employees” (OLMS 2014, 26). However, while general overhead activities include “support personnel at the labor organization’s headquarters” elsewhere the instructions specify that “an assistant, whenever possible, should be allocated at the same ratio [to activity categories] as the person or persons to whom they provide supports” (OLMS 2014, 29). These instructions suggest some mixing of tasks across categories—some representational activities are in fact routine clerical support performed for union representatives—which introduces measurement error into the independent variables. I expect this error to bias results toward zero, or conservatively in context of the hypotheses. Nevertheless, I validated these task measures in several ways.

First, I surveyed union representatives ( $N = 77$ ), asking which OLMS categories consist of clerical, organizing and managerial tasks. The Appendix provides further details on the survey methods and sampling frame. Figure 2 displays the results. Respondents reported that administration and general overhead jobs are dominated by clerical work. In contrast, the bulk of representational activities were organizing and management task-related: 93% of respondents reported that organizing and management tasks accounted for most of the work week of representational employees. Political work was mainly organizing and management related as well. As expected, the union employees actually filling out the OLMS forms interpret routine clerical tasks as administrative and general overhead activities and non-routine interactional tasks as representational and political activities.

[Figure 2 about here.]

Second, I obtained 2 months of job postings from a site dedicated to listing employment opportunities for labor unions (UnionJobs.com). By matching the job title and union name of these postings to the OLMS data, it is possible to see how reported activities vary with listed job responsibilities. The Appendix provides further detail on the coding, merging and analysis of these job postings. Figure 3 shows that job responsibilities vary in predictable ways with job activity codes. Positions with a high portion of representational activities are more likely to list responsibilities like communicate and organize with workers and negotiate contracts. Positions with a high portion of political activities are more likely to involve political affairs and coordination with outside organizations. In contrast, administrative and general overhead positions involve more budgeting and finance, and



less organizing, coordination with other organizations and negotiations. While some job responsibilities are either too rare for tight estimation (like media or database and research) or ambiguously related to the OLMS activities (like staff training), this analysis shows important distinctions in job responsibilities by the OLMS activities.

[Figure 3 about here.]

Together, these survey and job posting data triangulate the OLMS reports with independent data on tasks. Figure 4 shows task-specific earnings premiums over time, conditional on worker fixed effects. Increasing general overhead or administrative activities is associated with declining worker earnings. Representational and political tasks receive higher pay than general overhead and administrative tasks and this premium increases over time, while pay for administrative and general overhead tasks declines. These patterns are consistent with shifts in pay premiums across occupations observed in nationally representative data: complex tasks involving social interaction have earned rising pay-offs while clerical and administrative work declined (Deming 2017; Autor and Dorn 2013). Notwithstanding the institutional peculiarities of working for a labor union, task premium trends for union employees are similar to national trends.

[Figure 4 about here.]

The hypotheses above address the *structure* of tasks, not their content. I use the task reports to construct two measures of the division of labor, tracking individual worker-level task variety and job turf. To capture task variety, I use a Theil entropy score for the degree of task diversity within a job. This measure has been used previously to assess racial diversity in schools and neighborhoods (Theil and Finizza 1971; Reardon and Firebaugh 2002). An entropy score  $E_{it}$  is calculated for each worker ( $i$ )-year ( $t$ ) using the share of each activity  $a$ ,  $\pi_{ita}$ :

$$E_{it} = \sum_a \pi_{ita} * \log(1/\pi_{ita}).$$

Jobs with a higher score are closer to an even mix task types, while jobs with a lower score have a more homogenous set of tasks. As specialization increases, jobs become simpler with respect to their mix of tasks and  $E_{it}$  decreases.<sup>4</sup>

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<sup>4</sup>Several less precise measures of task variety are highly correlated with this one—a binary indicator for multiple

Second, to measure job turf, I calculate each nodal worker’s share of a task out of her co-workers’ total work in that task category, and then use the largest of those task shares as the job turf accessible to the nodal worker:

$$N_{it} = \max_a(\pi_{ita}/\pi_{uta}),$$

where  $\pi_{uta}$  is the sum of task shares  $\pi_{ita}$  of a given task type  $a$  across all employees in a union ( $u$ )-year ( $t$ ). As a nodal worker increases her share of a given task relative to her co-workers,  $N_{it}$  approaches 1. When a nodal worker is the sole employee of a union doing a given task,  $N_{it} = 1$ .<sup>5</sup>

[Figure 5 about here.]

Figure 5 (a) plots earnings effects of these two task structure measures. Consistent with hypotheses 2 and 3, these two facets of the task structure consistently affect pay premiums during the period. While increasing task variety is associated with increases in earnings, increasing job turf or non-redundancy with co-workers also increases earnings. Figure 5 (b) plots task structure by job tenure. As employment tenure increases, employees are more likely to occupy job turfs and have jobs composed of a mix of multiple activities. Together, these descriptive findings suggest that the task structure measures are picking up real variation in employment conditions.

## Methods

To test the hypotheses above, I proceed in several steps. I begin by assessing hypothesis 1 about the systemic interdependence among co-workers’ task structure by modeling job turf as a function of co-workers’ task variety. Next, I test hypotheses 2 and 3 with a series of wage models. I focus on excluding a number of potential sources of bias by adding a series of stringent fixed effects that isolate variation within-job and within-labor market conditions. These analyses together test whether task structure yields unequal pay premiums within organizations. In a final step I consider whether unequal task structure pay premiums increase absolute within-organization inequality, by asking who receives the premiums.

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tasks ( $\rho = 0.74$ ) and the number of different tasks performed ( $\rho = 0.84$ ). Earnings results presented in the main results below are robust across these different measures of task variety.

<sup>5</sup>As with task variety, several alternative measures of turf or non-redundancy are highly correlated—a binary indicator for being the only employee performing a task type ( $\rho = 0.71$ ) and the average turf across all of a job’s tasks, weighted by task shares of  $\pi_{ita}/\Pi_{uta}$  ( $\rho = 0.92$ )—and earnings effects are similar across these measures.

I test hypothesis 1 by predicting job turf  $x_{iut}^a$  with co-workers' task variety  $x_{iut}^b$ :

$$x_{iut}^a = \beta x_{iut}^b + \beta \mathbf{x}'_{iut} + \lambda \mathbf{w}'_{iut} + \alpha'_i + \gamma'_t + \epsilon_{iut}, \quad (1)$$

$\mathbf{x}'_{iut}$  is a vector of task predictors, including task variety, turf and task content.  $\mathbf{x}'_{iut}$  includes a control for the nodal worker's own task variety separately from co-workers' average task variety in order to assess whether a worker's own task variety is positively or negatively associated with job turf.  $\mathbf{w}'_{iut}$  includes controls for worker tenure and industry experience, calculated as the number of years each employee has worked for their current union employer since 2000 and the number of years each employee appears in the dataset working for any union since 2000, respectively.<sup>6</sup> As hypothesis 1 focuses on the reallocation of a fixed set of tasks across co-workers, in some models I restrict the union fixed effect to unions with constant worker composition and a constant task set. Worker composition is the average worker fixed effect (estimated from a two-way worker-firm fixed effects model (Abowd, Kramarz, and Margolis 1999)) and the total employment in the union. Total tasks are the sum of all tasks performed by employees of the union. This more restrictive fixed effect at the organization level excludes changes in task allocation attributable to entry and exit of workers or shifting task composition. Remaining task structure variation is due exclusively to the division of labor, or the re-allocation of the same tasks among the same workers.

Next I set up the following general earnings model, to test hypotheses 2 and 3:

$$\log(y_{iut}) = \beta \mathbf{x}'_{iut} + \lambda \mathbf{w}'_{iut} + \alpha'_i + \gamma'_t + \epsilon_{iut}, \quad (2)$$

where  $y_{iut}$  is worker earnings. As in equation 1, I include controls for task content, tenure and experience in vectors  $\mathbf{x}'_{iut}$  and  $\mathbf{w}'_{iut}$ . By studying changes in the variance and distribution of  $\epsilon_{iut}$  in response for controls for tenure and experience, task content and finally task structure, this model allows the quantification of the share of within-organization inequality explained by each of these determinants of earnings.

Second, I modify the earnings model to address a series of potential threats to inference, ranging from unobservable worker characteristics to labor market and workplace-wide dynamics. Beyond

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<sup>6</sup>OLMS makes data available starting from 2000. Only data reported from 2005 and after includes task measures, but using the prior years of data allows a more accurate calculation of tenure and industry experience.

differences in task content and observable human capital, recent research emphasizes that sorting on unobservable characteristics can account for apparent organizational earnings effects (Song, Price, Guvenen, Bloom, and von Wachter 2018). To control for wage premiums associated with time-invariant worker ability or with the quality of worker-workplace matches, I add individual by union effects  $\alpha_i$ . However, much variation in task assignment within worker-workplace matches can be expected to be attributable to workers switching jobs within an organization. Changing job titles can bring earnings changes through a shift in position in an organizational hierarchy or formal status structure. These promotion or demotion effects may happen simultaneously with task changes. As such, in more stringent models I add worker by union by job title effects to focus on task changes that take place within a given job, rather than through movement across different positions within an organization. This within-job analysis limits the confounding influence of changing positions within an organizational hierarchy.

These controls for time-invariant worker and job features still leave two crucial *time-varying* omitted variables: workplace institutional pay setting and local labor market conditions. Insofar as the former involves shifts in rent-sharing or collective pay rules that affect all workers in a workplace, I address it by including union by year fixed effects. This control removes variation in pay due to changes like a shock to union revenue or changes in workplace pay practices (assuming that such changes have a common effect on co-workers). Second, I control for changes in local labor market conditions, which could change workers' outside option at the same time as their task structure shifts. For example, an increased supply of college graduates might lower the premium for workers doing representational-interactive work in a way that is correlated with changes in task mix for those workers. Specifically, I add city by year by main task fixed effects, which control for local labor market conditions that may affect workers at different skill levels differently. Together, these time-varying effects  $\gamma'_t$  help distinguish changes in task structure from the dominant explanations for pay changes canvassed in prior research: shifts in workplace pay institutions or local labor market supply and demand. Remaining variation can be reliably attributed to changes in a workers' surplus due to task structure.

## Main Results

Hypothesis 1 predicts that co-workers' task assignments are interdependent via a two-sided job specialization process. When an organization reduces task variety for some workers, it must assign other workers job turf.

Table 4 predicts changes in job turf associated with changes in co-workers' task variety. When a worker's co-workers have an average decrease in task variety, the nodal worker experiences an increase in job turf. Model 2 shows that this results holds conditional on controls for tenure, experience, task content and even the task variety of the nodal worker. Note that the worker's own task variety is positively associated with job turf. When a worker shifts toward a single task, it is often one commonly performed in the organization, while workers who increasingly hold job turf in a given task often do not spend all of their time on that task. This pattern suggests that in these data panel (b) in Figure 1 is more typical than panel (a): changes in job turf and task variety are not offsetting and opposite effects, but rather increase together for an individual worker. When organizations reduce task variety across jobs, it is different workers who gain from the collateral creation of job turf than those who lose task premiums through lower task variety.

[Table 3 about here.]

Hypothesis 1 focuses on the case of pure task reallocation, where employers shift a fixed set of tasks across a fixed group of workers. This is a realistic scenario facing many organizations in the short-run: the task set is often given by the demands of production and employees are costly to hire and fire. In Models 3 and 4, I isolate this task reallocation channel by restricting analysis to job spells in periods and organizations that do not change employment or task content. The association between decreased coworkers' task variety and increased job turf strengthens with these restrictions. When worker composition changes substantially, this can introduce more degrees of freedom between task allocations. In the pure task reallocation setting, a 1 percentage point decrease in co-workers' task variety is associated with a 0.65 percentage point increase in the nodal worker's job turf. Reducing task variety for some workers yields job turf for others.

Given this basic systemic interdependency in task allocation, does task structure affect workers' earnings? Models 1, 2 and 3 of Table 5 build a model of within-organization inequality by sequentially adding observable worker attributes that could explain variability in earnings. All models include

union by year fixed effects, so only within-organization differences in earnings among co-workers are modeled. In a baseline model, not shown, organization by year fixed effects account for 28% of the total earnings variance in this industry: most inequality in these data is among co-workers. Model 1 shows that tenure and experience explain around 11% of the remaining within-union, between-person variance. Model 2 adds controls for the task content performed by each worker, which explains another 4% of variance. Consistent with Figure 4, workers doing more representational and political tasks are paid around 35% more than workers doing general overhead work.<sup>7</sup> Finally, I add the measures of task structure—task variety and job turf—which explain another 4% of within-organization earnings variation. Task structure thus makes a contribution to within-organization earnings variance comparable to that of task content.

[Table 4 about here.]

Consistent with hypotheses 3 and 2 these between-person results show that earnings differences associated with different positions in task structure explain a quantitatively important part of within-organization earnings inequality. However, the task structure effects in Model 3 could be driven by job turf and high task variety positions being filled by higher ability workers. Apparent differences in earnings across task positions could be due to different fixed differences in external market demand for different workers. In this case, organizational decisions about task structure would only transmit inequality in labor market price, rather than independently generate inequality.

To control for differences in worker ability, Model 4 adds worker-union fixed effects, to estimate earnings effects from within worker-employer-match variation. This model attenuates the effect of task variety relative to Model 3: part of the apparent premium associated with performing multiple tasks is attributable to higher ability workers being assigned more task variety. Nonetheless, even with the job fixed effects, when task variety increases, earnings increase. Shifting from doing an even mix of multiple tasks to doing a single task is associated with an 11% decline in earnings. When the availability of job turf increases, earnings increase at a rate similar to that estimated in the between-person model. Specifically, a one standard deviation increase in task uniqueness is associated with a 4% increase in earnings.

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<sup>7</sup>In the interpretation of all logged earnings effects, I exponentiate the coefficient presented in the results table for an elasticity or percentage change interpretation.

These estimates of the earnings effects of shifting task structure are not driven by time-invariant worker characteristics or by shifting task content. However, the patterns in Model 4 could still come from earnings changes associated with promotion and movement across job titles. Promotion can involve changes in status and authority over and above changes in task content or task structure. To avoid contamination with these changes in formal job title, Model 5 adds worker by union by job title fixed effects and estimates task structure effects using only within-job changes in earnings and task assignment. Results in Table 5 are consistent with Model 4, with a further (statistically non-significant) attenuation of the task variety point estimate.

Task structure could also change with the exigencies of local labor market dynamics. While worker fixed effects control for time-invariant differences in ability, labor market prices can vary over time and across task types and local labor markets. If a worker is exclusively assigned a given task at the same time as demand for workers who can do that task increases, then apparent job turf pay premiums could be attributable to changes in market demand. To address this concern, Model 6 adds city by main task by year effects to control for local changes in skill-specific labor demand. Even in this most stringent model, results are consistent with Model 4.

Overall, wage effects of task structure are consistent with hypotheses 2 and 3. Standardized coefficients (not shown in Table 5) show that within-worker earnings effects of roughly equivalent magnitude arise from a standard deviation increase in job variety (2.5%) and in job turf (3%). Both task variety and turf are important determinants of worker earnings.

### **Within-organization Inequality**

Taken together, these task structure and wage models show that the horizontal division of labor can drive differences in organizational pay premiums. Job turf allows some workers to receive pay premiums above underlying worker ability or skill-specific labor market demand, while simultaneous reductions in task variety for co-workers yield lower pay premiums. But, unequal pay premiums need not increase inequality inside organizations. In unionized workplaces, pay premiums for low-wage workers are coupled with penalties for managers, such that unequal organizational pay effects yield reduced within-workplace inequality (Rosenfeld 2006). Overall inequality effects of task structure depend in large part on whether otherwise low- or high-earning workers tend to receive favorable positions in task structure.

The overall distributional effect of these dynamics will likely vary across industries and organizations. However, as a summary, I consider the overall correlation between increases in the organizational division of labor and changes in wage inequality. Figure 6 shows that when organizations increase job specialization, earnings inequality tends to increase. The within-organization panel correlation of these changes is 0.12. Overall, increasing task specialization is associated with increased organizational earnings inequality.

[Figure 6 about here.]

A key reason for this inequality effect is that workers who receive otherwise higher earnings are also more likely to enjoy an advantaged position in task structure. Figure 7 visualizes this pattern by showing how rates of job turf and task variety vary across the within-organization earnings distribution. To exclude the earnings effect of task structure itself, the earnings distribution is based off of the predicted and residual values from Model 5 in Table 5, subtracting the premiums due to task variety and job turf. Figure 7 shows that workers in the bottom of the job distribution have lower rates of both job turf and task variety than do workers at the top of the distribution. While the theory outlined in this paper focuses on how task structure generates unequal organizational pay premiums, these results suggest that task structure also contributes to overall organizational inequality.

[Figure 7 about here.]

## **Additional Analyses**

The main results demonstrate that reducing task variety for some workers tends to increase job turf for others. They also show that changes in task structure affect workers' earnings independent of shifts in task content, promotions, fixed worker ability, workplace-wide changes in pay setting practices or shifting supply and demand in the local labor market. This task structural source of organizational inequality hinges on worker and employer wage bargaining. In the following section, I first ask when job turf rather than task variety has a relatively larger effect. I then test the robustness of the main results with respect to several additional alternative explanations: time-variant worker selection, work intensification and changes in worker productivity. Finally, I consider



a key condition that bounds the relevance of task structure for wage determination and within-organization inequality.

## Employer Power and Task Structure

Both reductions in task variety and increases in task turf can occur through the same process of workplace-wide specialization. And, the earnings effects of each of these dimensions of task structure are roughly similar on average. So, under what conditions is task variety or job turf relatively more important for determining the earnings effects of specialization? In this section, I show that these two axes of task structure vary according to employer labor market power.

Gaining job turf raises the costs associated with a worker’s threat of exit. If a worker has sole access to task- and organization-specific learning, then replacing that worker will be costly. But if the worker’s exit threat is implausible due to a concentrated labor market, even exclusive possession of trade secrets will not yield a worker a share of the match surplus. Employer power in the labor market will thus dampen the earnings premium from occupying job turf. In contrast, when employers reduce a worker’s task variety, they heighten a worker’s risk of replacement. This threat becomes *more* plausible in a concentrated or oversupplied labor market. Employer power will intensify the costs to workers of losing task variety, but dull the benefits of possessing job turf.

Following recent research on employer labor market power, I consider how task variety and job turf effects vary by the local labor market Herfindahl-Hirschman index (Azar, Marinescu, and Steinbaum 2017; Benmelech, Bergman, and Kim 2018).<sup>8</sup> Models 1, 2 and 3 in Table 6 break estimates out across more and less concentrated labor markets. Consistent with the proposed theory, reductions in task variety are around twice as costly for workers in a highly concentrated labor market ( $HHI > 0.60$ ) relative to a competitive market ( $HHI < 0.08$ ). In contrast, possessing job turf in a concentrated market provides less benefit than in a competitive market: when a worker cannot credibly threaten exit, turf does not increase her value. Model 4 returns to the full sample and interacts the task structure variables with a continuous interaction for HHI (the main HHI coefficient

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<sup>8</sup>HHI is defined for each city-year  $m$  as

$$HHI_m = \sum_i s_i^2 \tag{3}$$

where  $s$  is each union  $i$ ’s share of total employment in the labor market  $m$ . This is an industry-specific HHI, which defines the relevant labor market as labor union employers, consistent with prior research on labor market power (Benmelech, Bergman, and Kim 2018).

is absorbed in the city by task by year controls), which is significantly positive for task variety and negative for job turf. Together, these results provide more evidence that task structure affects worker earnings specifically by affecting wage bargaining with employers. It also shows that the distinct advantages of task structure are unlikely to be purely counterbalancing in aggregate. Not only are different workers in a given workplace exposed differentially to each side of task structure, but in different labor markets the earnings effects of one or the other side of specialization will dominate depending on employer power.

[Table 5 about here.]

### **Time-variant Worker Selection**

The models in Table 5 assume that within-worker task assignment is made exogenously, conditional on controls and fixed effects. However, task assignment likely involves positive and time-varying selection: employers try to assign a worker to tasks that she tackles effectively. If an employer learns more about a worker's ability and reassigns her accordingly, then workers' earnings may increase as task fit improves. Note that job turf effects presupposes that a worker is learning something about their task: her bargaining position flows from the value of that learning to the employer. However, in positive worker selection, the effect is not due to the worker learning about her task, but to the employer learning about the quality of a worker-task match.

To test for this selection problem, I use the ebb and flow of union political activities as a circumstance in which task allocation changes due to changes in task demand, rather than due to worker selection and employer learning. Many apparent changes in task composition could be driven by a learning process, rather than by a change in underlying demand. For instance, if an incumbent employee excelled at new worker organizing rather than at administrative work, this might push her employer toward increased organizing efforts. In contrast, part of the variation in union political activities is given by exogenous rhythms of the election cycle: panel (a) in Figure 10 (in the Appendix) shows that union political spending increases in presidential and midterm election years. Panel (b) shows that political spending is tightly correlated with the share of political activities performed by union employees. To identify variation in demand for union political activities beneath these national election patterns—for example, closer elections or those with a more strongly pro-labor

candidate—I calculate city-year averages of union political spending, leaving out the nodal union. This share of nearby political spending serves as a jackknife instrument that affects task structure for different workers in the same union differently, depending on their level of political involvement. For union employees in jobs not already devoted to political activities, increased political activities increases the diversity of tasks they perform. For employees who already performed many political activities (specifically, for over half of their job), further raising political involvement narrows their job toward a single task: politics. An increase in political activities can also affect job turf. For political operatives, the influx of other employees into political activities dilutes their job turf.

Increased local demand for political tasks could also affect workers’ earnings in other ways. Most importantly, increased local demand for political operatives could increase the task premium associated with political activities. I control for this channel with the task-specific labor market by year fixed effects defined above. Political engagement could also be associated with increased pay across a whole organization. I control for this possibility with the union by year effects defined above. Identification comes from comparing the change in task structure due to a local election for more and less politically involved employees. While the instrument can only be used for one task structure variable at a time, I include the non-instrumented variable as a control. Given these controls, the instrument is excludable and should only affect worker earnings via changes in the task structure of their jobs.<sup>9</sup>

[Table 6 about here.]

Table 7 gives the results of this IV analysis. The first-stage result for task variety shows that for employees with a high share of political activities, increased peer union political spending is associated with increased task variety. The IV estimate indicates that a shift from a multi-task toward a single-task mix, instigated by an increase in union political involvement, is associated with a 16% decrease in worker earnings. Likewise, the instrumented increase in job turf is associated

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<sup>9</sup> I set up the model in a standard IV framework:

$$\begin{cases} y_{iut} &= \tau z_{iut} + \lambda \mathbf{w}'_{iut} + \boldsymbol{\alpha}' + \epsilon_{iut} \\ x^a_{iut} &= \phi z_{iut} + \lambda \mathbf{w}'_{iut} + \boldsymbol{\alpha}' + \eta_{iut} \end{cases} \quad (4)$$

where  $\frac{\tau}{\phi}$  approaches an unbiased estimate of  $\beta$  from equation 2. Peer union spending interacted with individual workers’ political activities is the instrument  $z_{iut}$ .  $x^a_{iut}$  is the focal measure of task structure  $a$ , either task variety or job turf, for a given model (the non-focal measure is included as a control). Vectors  $\mathbf{w}'_{iut}$  and  $\boldsymbol{\alpha}'$  include all controls and fixed effects in the strictest version of equation 2.

with a 33% raise in earnings. These estimates are similar to the OLS models reported in Table 5 and suggest that the earnings effects of task structure are not driven only by time-variant worker selection. Even when task reassignment arises from a change in employer-side task demand, task structure still affects worker earnings.

## Work Hours and Work Intensification

The OLMS data do not include the total number of tasks completed or total hours worked. As such, it is possible that when task variety decreases, total work amount declines: one way to shift a worker from an even split between representational and administrative activities is to remove the representational activities and shift the worker to part-time employment. Likewise, an apparent increase in job turf could come from work intensification. If representational tasks are shifted from worker A to worker B, then worker B may not receive a compensating reduction in general overhead tasks. In both of these cases, apparent earnings effects of task structure changes could actually result from work intensification.

I test for this alternative explanation in two ways. First, I define a narrower union fixed effect, in which the union panel (and the worker-union-job title panel) resets with changes in the total percentage amount of union tasks across all employees in the workplace. This approach approximates fixing the total quantity of union tasks, and looks only at a reallocation of tasks among union employees. Model 2 in Table 10 uses this fixed union-wide task constraint. While the sample is substantially reduced, the earnings effects of job turf and task variety remain qualitatively consistent with the main results. Of course, constant task percentages could still mask task quantity changes within a union. Nonetheless, these results provide evidence against reductions in total task amounts driving the main results.

Second, I try excluding observations that are likely to be part-year or part-time workers. To remove part-year workers, I restrict the sample to exclude workers in their first and last year of employment at a given workplace. To remove part-time workers, I try excluding all lower earning workers. Specifically I exclude all workers in the bottom 25% of the sample (<\$32,000 earnings). Results in Table 10 (in the Appendix) show that these various sample restrictions attenuate the earnings effects of task structure, but the effects remain qualitatively consistent and statistically significant. This attenuation is consistent with biasing estimates downward by truncating the left

tail of the earnings distribution. It is also consistent with the possibility that the earnings of temporary and part-time workers, bereft of other wage guarantees, are more affected by changes in task structure than are full-time and permanent employees. But even excluding all three categories of workers who are likely to be part-year or part-time, earnings effects of task structure persist. Overall, these results suggest that work intensification is not driving apparent task structure effects.

## **Vertical and Horizontal Task Distinctions**

The OLMS activity codes capture horizontal differences in task areas more than they do vertical distinctions between managers and employees. As such, it is possible that changes in task assignment have different meanings across vertical categories. Including union by worker by job title fixed effects mitigates this concern, as effects are estimated within a given hierarchical level (as proxied by job title). However, it is possible that task structure changes only matter for positions of authority. If this is the case, then apparent task structure effects could in fact be driven by changes in managerial span of control: as a manager covers more task areas, she is likely to have a larger number of reports.

To assess this concern, I split the sample between managers and non-managers, using key words from job titles.<sup>10</sup> Managers account for 20% of all union employees. Models 5 and 6 in Table 10 show that for both managerial and non-managerial employees the effects of task variety and turf are similar. These results suggest that heterogeneity across unobserved vertical task distinctions is not biasing results. For both managers and non-managers, task variety and turf determine earnings.

## **Productivity, Specialization and Coordination Costs**

I argue that the earnings effects of task structure are due to changes in bargaining over pay premiums between worker and employer. This theory implies that task structure should affect not only workers' earnings, but their earnings relative to overall organizational productivity: if worker earnings increase strictly in line with productivity, then task structure has not shifted workplace bargaining.

In contrast, theories from organizational economics emphasize the productivity trade-off in task structure between honing performance through focus vs. incurring coordination costs across fragmented jobs involving interdependent tasks (Becker and Murphy 1992; Lindbeck and Snower 2000).

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<sup>10</sup>Managers are categorized as those with titles including the words president, lead, director, manager, head, senior or supervisor.

By this theory, job turf could raise wages by minimizing coordination costs, which in turn would mean that worker earnings increase in line with increased productivity. Similarly, lowering task variety could lower wages and not raise revenue received per dollar of wage payment, if it increases coordination costs across simplified but task-interdependent jobs.

In my theory, the differential exposure of workers to specific task allocations causes a concomitant change in worker-employer wage bargaining. If earnings change for this reason, they will not be offset by shifts in workplace-wide productivity. As such, variation in bargaining power should affect the revenue unions derive from each dollar of wages. Specifically, reducing task variety should raise the productivity derived per dollar of wages, as employers can pay less per task and thus generate the same revenue with lower labor costs. On the other hand, allowing job turf should lower productivity per dollar of wages, as decreased task redundancy boosts worker bargaining power.

Unfortunately, the OLMS data do not include individual worker productivity. However, it is possible to estimate an organization-wide productivity model using union financial disclosures. I fit models predicting two definitions of productivity. First, dollars of revenue ( $r_{ut}$ ) per union employee, gives aggregate productivity per worker and could vary with task structure according to the balance between gains from specialization and coordination costs. Second, dollars of revenue ( $r_{ut}$ ) per dollar of salary ( $w_{ut}$ ) paid to union employees gives the key match- and bargaining-specific outcome that distinguishes my theory from general theories of productivity: how much of aggregate productivity is captured by workers under different task structure allocations? I model these measures of productivity conditional on other production inputs:

$$\log(p_{ut}) = \gamma_1 \mathbf{K}'_{ut} + \gamma_2 M_{ut} + \gamma_3 \mathbf{L}'_{ut} + \boldsymbol{\alpha}' + e_{ut}. \quad (5)$$

where  $K'_{ut}$  is union capital, or logged total union assets and logged total union membership.<sup>11</sup> Beyond capital, I also control for logged non-labor costs,  $M'_{ut}$ , as unions may substitute labor with other inputs differently depending on task structure. For the final production input, labor, I include a vector of controls  $L'_{ut}$  to capture characteristics of labor.  $L'_{ut}$  includes the workplace-level average task shares and organizational job turf availability in union  $u$ . I also control for union-level task

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<sup>11</sup>I include membership as capital because union rights to represent and receive dues from members can be interpreted as an organizational asset. Results are robust to excluding the union membership control, which gives an equation equivalent to conventional productivity models.

shares and logged union employment, as skill intensity (proxied here by task composition) and workplace size can both affect productivity per dollar of labor cost. Alongside these production inputs, I include union fixed effects to account for unobserved, time-invariant differences in productivity across unions. To control for local labor market variation, I add city by year effects. Finally, I control for broader changes in union policy that could be associated with both task structure and pay, by including year by parent union fixed effects.

[Table 7 about here.]

Table 8 displays the results from these productivity models. Model 1 shows that, consistent with gains from specialization outpacing coordination costs, decreasing task variety is associated with higher productivity. Union employers are right to seek specialization through reducing task variety by job. This result is consistent across models controlling for local labor market and parent-wide productivity changes. Increased job turf on the other hand, does seem associated with higher overall productivity. However, this effect attenuates substantially and loses statistical significance with the inclusion of the more stringent fixed effects. These results show that task structure, and particularly task variety, can indeed affect aggregate firm-level productivity.

Next, I distinguish overall productivity changes from match-specific bargaining effects by predicting revenue per dollar of wage cost. Model 4 shows that as unions increase average task variety and job turf, revenue per dollar decreases. Workers with high task variety and high job turf are able to negotiate for a larger share of union revenue paid as labor costs. Models 5 and 6 find that these results are robust to controlling for local labor market and union parent-wide changes in productivity. While these results are at the workplace- and not worker-level, they nonetheless provide evidence consistent with shifting bargaining dynamics, rather than a pure pass-through of increased productivity. Different configurations of tasks into jobs leave employers with different amounts of revenue relative to labor costs.

## **Pay-setting Policies as a Boundary Condition**

The theory proposed and tested here implies wage setting that is responsive to work tasks. This premise is fairly benign. Aside from income-sharing communes, the vast bulk of organizations make some reference to underlying work tasks in determining pay. For example, formal approaches to job

evaluation, like the Hay system, focus on linking work tasks to pay levels (Steinberg 1992). However, ongoing haggling and leveraging—of the kind that translates differences in job turf and task variety into wage differences—is likely more prominent in organizations that have more flexible wage setting policies. In the context of labor unions, small and local unions are more often defined by informal pay setting. In a sample of national union headquarters, 73 percent of unions with more than 50,000 members reported having human resources departments, compared to only 10 percent of unions with less than 50,000 members (Gray, Whitehead, and Clark 2019). In large headquarters unions, staff unions are common and often impose common pay scales across job types (Clark 1989). If the task structure-earnings patterns identified here hinge on individualized pay bargaining, then they should be more prominent at smaller unions.

In Table 9 I test this boundary condition that task structure matters less in determining pay at organizations with less flexible pay-setting. Based on the prior research on pay-setting in labor unions, I proxy for individualized wage setting with organization size. Models 1, 2, and 3 break out the sample of unions by employment levels and indicate that both task variety and job turf matter less in large organizations. Limiting the sample to organizations with more than 100 employees attenuates the effect of task variety by around one half and attenuates the estimate of job turf to the point that it loses statistical significance. Model 4 adds continuous interactions with organization size and confirms that in organizations with higher employment levels, both task variety and job turf have a reduced pay-off relative to smaller organizations.

[Table 8 about here.]

Note that these results do not imply that task structure only matters in small organizations with informal wage setting. In many large, for-profit firms, wage setting remains highly responsive to task assignment and to performance. The general boundary condition proposed is that task structure will be more important for determining pay among employers embracing more individualized, worker-specific pay setting policies.

## Discussion

When organizations reduce task variety in a job, they lower skill requirements and weaken incumbents' signaled ability. But insofar as specialization allows one or a small number of workers



to dominate a given task area, it provides a scarce source of learning. Employers generally cannot achieve reductions in task variety for some workers without surrendering job turf to their co-workers: as task variety among co-workers decreases, job turf for a nodal worker increases. The magnitude of each of these earnings effects, while similar on average, varies inversely with employer power: in concentrated labor markets, reducing task variety has a stronger negative effect on earnings, while increasing job turf has a reduced pay-off for workers. The result is a trade-off inherent in the division of labor, which distributes organizational pay premiums unequally across co-workers.

These findings hinge on a rare opportunity to measure work tasks across many organizations in a single industry (employees of labor unions). There are nonetheless two critical limitations of the data, which suggest directions for future research. First, the activity codes used to measure tasks are broad designations. I validate the codes in several ways, but I am unable to recover the kind of detailed task measurements that are available in single-organization case studies. Critically, if shifts in the composition of underlying tasks across activity codes are associated with changes in job turf and task variety, then part of the estimated task structure effect could in fact be due to changing task content. Administrative data from other industries with more fine-grained task reporting, like the medical professions, would help address this problem.

A second key limitation is that labor unions are a strange type of organization and can be expected to be particularly atypical in the area of employment relations and job construction. However, the key nexus of divided labor studied here—between clerical and strategic-interactive tasks—is common across white collar office settings. Future research on other industries or using economy-wide data will help assess the external validity of these findings. One promising new data source is the Bureau of Labor Statistics' Occupational Requirements Survey (ORS) microdata, first fielded in 2017. The ORS surveys owners and managers about the activities and qualifications required of different jobs at the same workplace. More generally, as interest in directly measuring work tasks increases across the social sciences ([Autor and Handel 2013](#)), the results of the present analysis demonstrate the importance of measuring tasks in the organizational context in which they are performed.

Research from other industries would help specify additional boundary conditions for the theory, beyond the degree of wage flexibility and individualized pay setting. Task-specific learning should be most important in relatively highly skilled industries: simple, rote tasks require little learning

on the job, which mutes the effect of job turf. Some research argues that the tacit knowledge accumulated through low-paid work is substantial but socially undervalued ([Kusterer 1978](#); [Newman 2009](#)). Nonetheless, I expect that job turf is most important in settings where employers balance jobs across multiple distinct types of relatively complex tasks. Likewise, industries also vary in the coordination costs of specialization, which should affect the likelihood of job turf. In some industries, specialization will be a non-starter due to these coordination costs, which further limits the scope of the theory.

## Conclusion

This article provides a new theory of how organizations generate inequality over and above what is given by differences in market prices for skill. Instead of starting from formal bureaucracy, hierarchy and tournaments, I focus on how the underlying division of labor across tasks unevenly affects bargaining. Indeed, hierarchy and a fixed job structure, the lodestars of prior research on the organizational generation of inequality, are not a necessary condition for interdependence between workers to generate inequality. Even flat firms with little in the way of formal, fixed job positions can engage in horizontal specialization with differential effects across workers. Likewise, direct employee interaction and social network ties among co-workers are unnecessary to the theory. These findings suggest that researchers studying how organizations affect inequality could productively return to classic questions of of differentiation and the horizontal division of labor ([Blau 1970](#)).

For practitioners, this article uncovers a strategic tradeoff facing employers in the division of labor. Economists have previously identified a set of overall productivity tradeoffs in the division of labor: the gains from specialization and easier monitoring in divided labor can be offset by increased coordination costs and task complementarities ([Becker and Murphy 1992](#); [Holmstrom and Milgrom 1991](#); [Lindbeck and Snower 2000](#)). The analysis in this article identifies an orthogonal tradeoff: beyond production efficiency, strategic considerations could also influence employers' determination of the optimal level of organizational division of labor. Employer concern about workers deriving bargaining leverage from job turf might reduce the level of specialization below the limit given by coordination costs alone. Employers may consider maintaining redundancy across employees to mitigate holdup, just as buyers maintain redundancy among suppliers within a supply chain.

More broadly, considering both the job turf and task variety axes of task structure could help avoid unintended consequences of job restructuring. For example, practitioners focused on raising workers' wages by encouraging multitasking should consider inadvertent effects of relaxing the organizational division of labor (Herzberg 1968; Osterman 2006). While reducing task variety can indeed deskill work, its opposite can undermine job turf and make workers interchangeable. Job redesign initiatives aiming to raise wages must weigh these tradeoffs.

Better understanding how task assignments percolate through an organizational job structure could also provide a structural answer to why organizations using similar technology, and in the same product markets and organizational life stage, may allocate tasks into different sets of jobs (Cohen 2013). For example, in large bureaucratic organizations, technical interdependency preserves some jobs while eliminating others (Hasan, Ferguson, and Koning 2015). Other research has emphasized how variation in job structure across similar firms can stem from path dependence (Beckman and Burton 2008) or social categorization (Haveman, Swaminathan, and Johnson 2016). Research on relational inequality suggests more political causes, where advantaged managerial incumbents might construct jobs that advantage their allies (Tomaskovic-Devey and Avent-Holt 2019). The findings in the present article suggest, on the contrary, that the generation of job turf can be a byproduct of attempts to reduce labor costs and increase productivity. The difficulty of trading-off between turf and variety could lead otherwise similar organizations to very different job structures.

Regardless of the relative importance of these underlying determinants of task assignment, the task structure ideas introduced in this paper could provide a framework for more clearly connecting the growing literature on job construction to organizational inequality (Cohen 2013; Miner 1987; Tan 2015). Task structure demonstrates that processes of task assignment do not affect inequality only by unequally distributing task content across groups (Chan and Anteby 2016). Rather, the task structure framework predicts that the way that tasks are combined into jobs generates local scarcities of task-specific learning and differential exposure to external labor market competition. The detailed field work and qualitative case studies of job construction research is uniquely positioned to use this framework to link the micro-processes of task assignment to organizational-level inequality.

Research on both between-organization and between-occupational inequality neglects the detailed level of tasks (Mouw and Kalleberg 2010). When tasks are considered, they are proxied at the occupation level (Liu and Grusky 2013; Autor and Dorn 2013). Stratification researchers should con-

sider the implications for society-wide economic inequality of the task allocation processes modeled here. For example, reducing task variety can lower earnings and bargaining power for an incumbent worker, but thereby make another opportunity accessible for a less skilled outside applicant. Likewise, it is unclear whether the worker staking out job turf benefits at the expense of her employer or her co-workers, the latter of whom accumulate less valuable firm-specific knowledge than if they had access to the specialized task area. Just as a substantial empirical research program was necessary to establish the direction of the effects of unions on inequality—do they benefit their relatively low-wage members, or harm the unemployed and the non-union?—further research should consider the aggregate inequality effects of changes in organizations’ assembly of tasks into jobs.

The theory formulated here also puts analysis of institutional sources of worker bargaining power in a different hue. Prior research has emphasized solidarity among incumbent workers against external labor market competitors (Tilly 1998): for example, the costs of worker replacements were a key factor in determining union growth in the early 20<sup>th</sup> century (Kimeldorf 2013). This reasoning is consistent with the task variety and competitive exposure mechanism explored in this paper. But lost in this theory of collusive activity is how interchangeability among co-workers can sap an individual worker’s bargaining power. The effect of job turf demonstrated in this article implies that tactics like restrictive work rules and grievances over parochial matters that serve to differentiate, rather than homogenize, work groups could play an important role in establishing worker bargaining power (Kuhn 1961; Hartman 1969). These processes fade behind the more photogenic events of solidarity, like strikes or rallies—events, of course, orchestrated and organized by the employees studied in this paper. Yet, even the narrow, idiosyncratic bounds of an individual worker’s job turf can be fertile ground for bargaining power.

Beyond the study of wages and bargaining power, this article provides an organizationally-embedded approach to studying the trade-offs of specialization. Typically, researchers have studied this trade-off at the level of the career and long-term human capital accumulation (Merluzzi and Phillips 2016). In that research, specialization is a characteristic of workers and measured with academic concentration and work experience (Ferguson and Hasan 2013; Leung 2014). In this article, I measure specialization within organizations, where the degree of job distinctiveness varies with underlying task assignments. Consistent with prior research, it is not depth per se, but relative scarcity that brings value to a specialized position (Merluzzi and Phillips 2016). But unlike at the

level of individual choices about a career or education, specialization inside organizations imposes interdependency where choices about one job’s tasks affect another’s.

Indeed, this interdependence brings local, organizational circumstances into pay setting. The frictions and skill-specificities attendant to organizations insulate an emergent system of local skill scarcities. In this system, not only one’s own tasks matter for pay but also those of one’s co-workers. This approach contrasts with both market-based theories—in which local circumstances dissolve into labor market-wide prices—and old organizational theories of stratification—in which the rigidity and hierarchy of organizations provide local but fixed task positions for workers to move across. Task structure pay effects are local but not fixed in a formal hierarchy. They are governed by a system of co-worker interdependence. As fixed job structures and rigid pay setting decline, but organizations themselves persist, task structure imposes a persistent source of organizational inequality.

## Appendices

### OLMS Data

Unions are required to disclose financial and employment information in annual Labor-Management (LM) reporting forms, subject to audit by the Department of Labor’s Office of Labor-Management Standards (OLMS) ([OLMS 2017](#)). The OLMS is an office tasked with monitoring internal union officer elections and enforcing anti-corruption regulations on labor unions. In addition to facilitating regulatory action by the OLMS, the data collected through the LM forms provide publicly accessible information on labor union spending and employment practices. For example, a union member might be concerned about her union’s political spending or about how much her union representative is paid. The union member can pull the report for her specific union local and find this information. Due to the public transparency purpose of the reports, each union entity is identified by its specific name, its affiliation with a parent union entity, (e.g. Communications Workers of America (CWA), Local Union 1037) and a permanent, uniquely identifying “file number” that consistently identifies unions across years. Employees are reported by first, middle and last names and by a job title. I construct an employee identifier based on first and last names of each employee.

Figure 8 shows the form layout and questions covered in the employee information section of the LM form: unions must disclose the name, title, gross salary and any other disbursements re-

lated to each employee. In addition, the OLMS instructs unions to fill out “the percentage of time spent by each employee in the categories provided” to describe employees’ activities (Office of Labor-Management Standards 2014:19-20). This reporting requirement is only present on the LM-2 forms, covering unions with at least \$250,000 in revenue, so I exclude the small unions that do not meet this revenue threshold. Each employee’s total working time is broken out across the activity categories of administrative, general overhead, representational, political, and (charitable) contributions activities. As mentioned in the main text, the instructions for applying these categories include some ambiguity. Nonetheless, these activity reports provide a rare source of worker-level data on work tasks.

[Figure 8 about here.]

I analyze LM data from 2005 to 2017 and include all employees in unions with at least 1 employee. The average union in the analytic sample has 4 employees, but the average employee is in a union with 49 employees. Union employees are either elected officers (like union presidents or treasurers) or hired employees (like organizers or administrative assistants). Unions are not required to itemize salaries for employees who make less than \$10,000 in a year. For elected union officials, unions are required to report any payments. I exclude all union officials receiving below \$10,000, to ensure that only employee-like agents are included. Results are robust to excluding all elected union officers and focusing only on non-elected employees. In some cases unions list employees making below \$10,000 per year. I exclude them (8% of the sample) to ensure comparability across unions.

## **Survey Methods**

I conducted a survey of union representatives to assess the validity of the activities reports in the OLMS data as measures of work tasks. Instead of characterizing the activities reports solely through the official instructions available through the OLMS, I asked the originators of the union reports how they interpreted the OLMS’s categories in relation to their experience in their own unions. To identify union employees, I used public names and email addresses published by the Federal Mediation and Conciliation Service (FMCS) in 2015 and 2016. Unions are legally required to report upcoming collective bargaining to the FMCS and to include a contact person in those reports. The titles of the contacts listed indicate they are primarily union representatives and business agents,

along with a smattering of union presidents, union negotiators and labor lawyers.

To draw a sampling frame from these bargaining reports, I first dropped any contacts with missing email addresses and dropped all duplicated names. The remaining sampling frame consisted of 5,579 unique union employees. In March and April 2017, I randomly selected an initial pilot of 50 union employees, followed by a full survey of another 500 employees. Of these participants, 59 emails bounced, leaving 491 that actually arrived in respondents' inboxes. 18 participants opened the survey link but did not complete any questions. 77 respondents completed the survey (no respondents started the short survey but did not complete it). The response rate was 14%, or the total 77 respondents out of the 550 sampled. The participation rate, excluding sampled participants with bounced email addresses, was 16%. The survey rollout consisted of an introductory email, a follow-up email 3 days later and a last chance for participation notice 6 days after that. The introductory email for the survey explained that "you might have filled out LM forms at some point, so I want to ask which work tasks, in your experience, the Department of Labor's activity categories cover." The relatively low response rate (14%) likely reflects nonresponse from union representatives not involved in OLMS reporting.

For the survey instrument, I asked four separate questions covering representational, administrative, general overhead and political activities. I defined the categories based on a combination of background knowledge of union processes and attempting to commensurate with task distinctions used in prior research with O\*NET and occupation categories. I settled on clerical, organizing and management categories. The introductory text of the survey read as follows:

Every year, unions fill out "LM" forms for the Department of Labor. These forms ask how much each union employee works on *representational*, *administrative*, *general overhead*, and *political* activities.

I want to understand the day-to-day work that usually falls under each of these activities. For example, representational activities might consist mostly of clerical work ("Most of the week"), but next to no management and strategy work ("Very little time").

[Figure 9 about here.]

A sample question, for the representational activity category, is reproduced in Figure 9. The same questions were asked about administrative, general overhead and political activities (results

are reported in Figure 2). I also included a free text entry question at the end of the survey to solicit feedback.

## **Job Postings Coding**

In order to provide a second independent source of data on tasks, I matched the OLMS data with job listings scraped from UnionJobs.com. UnionJobs.com is a website that labor unions and pro-labor activist organizations use to post advertisements for staff jobs. I scraped all 350 active jobs listings on the site as of November 6th, 2018. Of these 350 postings, 306 were posted by actual labor unions (as opposed to allied groups, which do not report to the OLMS and are therefore not included in our main data). Next, the UnionJobs postings needed to be merged into the 2017 OLMS data, matching on parent union name and job title. This merge was done manually, with a research assistant looking for potential OLMS jobs that could correspond to the UnionJobs entries. We used the following procedure: (1) Restricting the OLMS data to the parent union who posted the UnionJobs advertisement; (2) Using a key word or word stem from the UnionJobs posting to pull potential OLMS matches; (3) Finally, a manual selection of the closest job titles, with up to 20 OLMS matches. For example, an administrative assistant at the AFL-CIO may be listed in a job advertisement as “Administrative Assistant—Economic Power and Growth Hub”. We would first try restricting by “Assistant” or “Admin” and then pick up to 20 of the closest potential matches.

Next, we coded each listing of responsibilities and tasks for the position (job postings followed a similar structure, of initial narrative introduction, followed by bullet points describing responsibilities and tasks). One research assistant developed codes inductively on an initial sample of 10 job listings: budgeting and finances; event planning; staff training; media and social media; coordination with other organizations; program evaluation; research, analysis, and database management; strategic planning; member relations from office (responding to routine communications and questions); communication with and organizing workers in person; negotiation with employers; political affairs; and a residual category. Another research assistant then assigned each bullet point in the full set of responsibilities for each job posting to one of these activity codes. This research assistant could not see the OLMS data and coded the UnionJobs postings without reference to the OLMS activity categories. 54 of the UnionJobs postings pertaining to jobs at labor unions had no bullet point structure and were excluded. Some bullet points listed no activities, but only qualifications and



background skills, which were left uncoded. In total, we ended up with 4,914 coded job duty bullet points and 2,134 job posting-OLMS pairs.

To compare the coded job postings and OLMS activities, we predicted each OLMS activity in a simple OLS model with an indicator for whether each of the codes appeared in a posting. For job postings that included multiple potential OLMS matches, we weighted each pair by the inverse of the number of matches. Standard errors were clustered at the parent union-level, to account for correlation in errors due to postings and OLMS jobs that appeared multiple times across different matches. The final results from these models are in Figure 3 in the main paper.

### **Additional Robustness Results**

Figure 10 panel (a) displays variation in union spending across the election cycle. Spending is highest during presidential election years and is also elevated during midterm election years. Panel (b) shows the strong correlation between union political spending and the amount of political activity undertaken by union employees. These graphical patterns lend support to the instrumental variable strategy described in the main paper.

[Figure 10 about here.]

Table 10 removes workers in their first or last year of employment, the bottom 25% of workers and both groups, as discussed in the main paper. Estimates attenuate, but remain qualitatively similar to the main models. Table 10 also includes estimates broken out by managerial and non-managerial employees, which show little heterogeneity across the two groups.

[Table 9 about here.]

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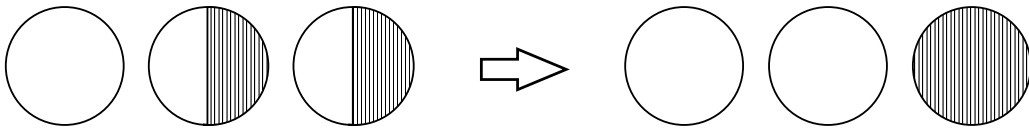
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Figure 1: Division of Labor Yields Job Turf and Lowers Task Variety, Often for Different Workers.

(a) Two jobs simplified; one job increases job turf.



(b) One job simplified; one increases job turf.

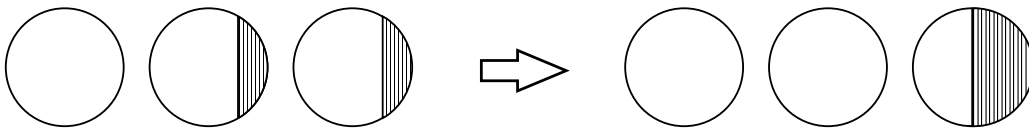
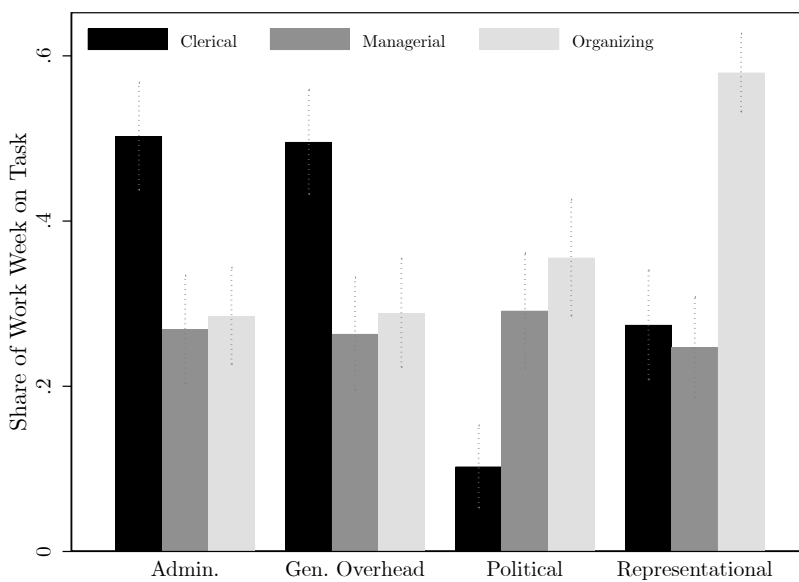
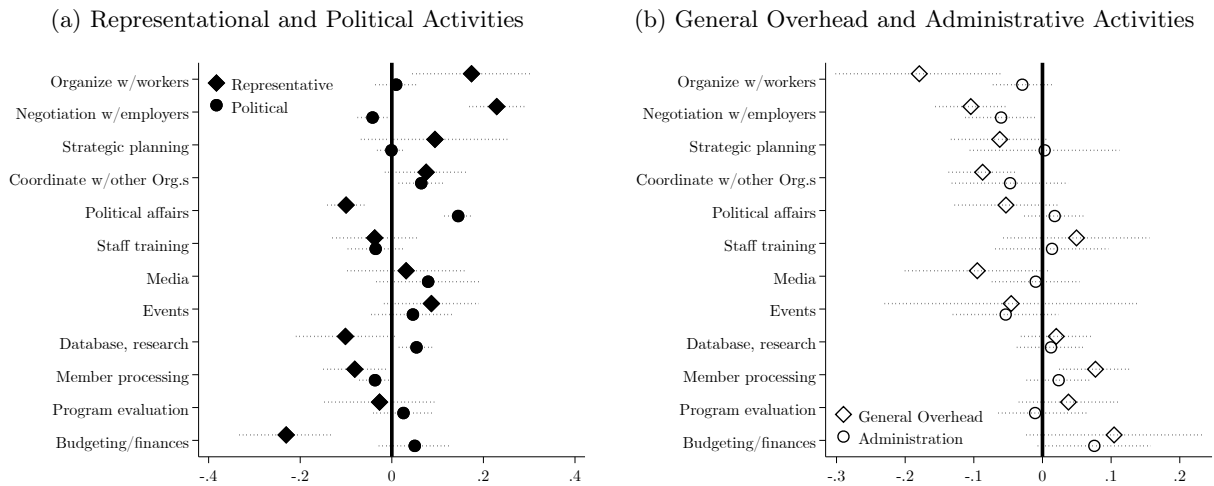


Figure 2: Distribution of Tasks by OLMS Activity Categories.



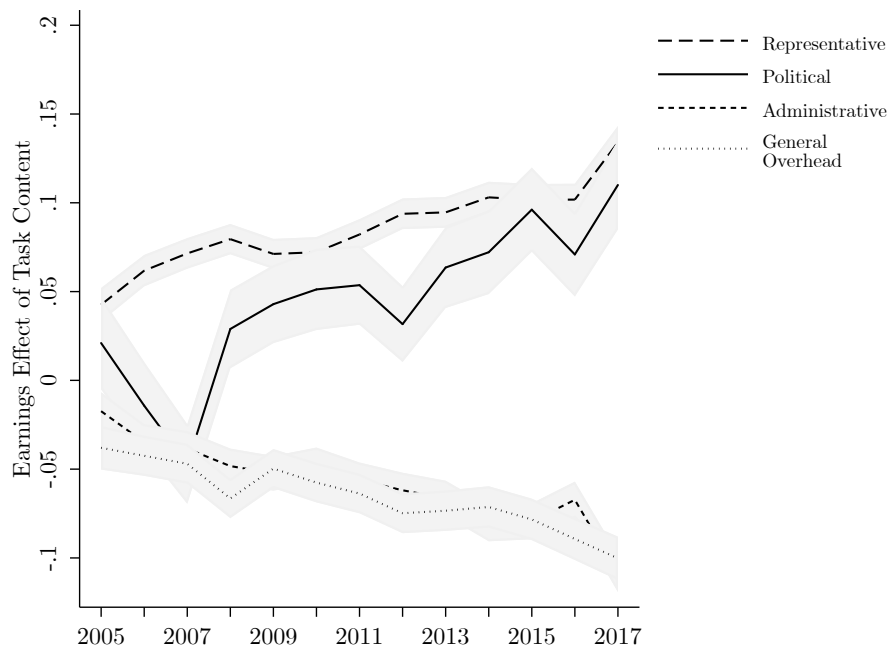
Note: Responses are coded as: Most of the week (0.7); Less than half of the week (0.3); Very little time (0). Responses need not sum to one. The source of these estimates is a survey of union employees and officials. For more details on the survey, see the Appendix.

Figure 3: OLMS Activity Categories Track Different Responsibilities Listed in Matched Job Postings.



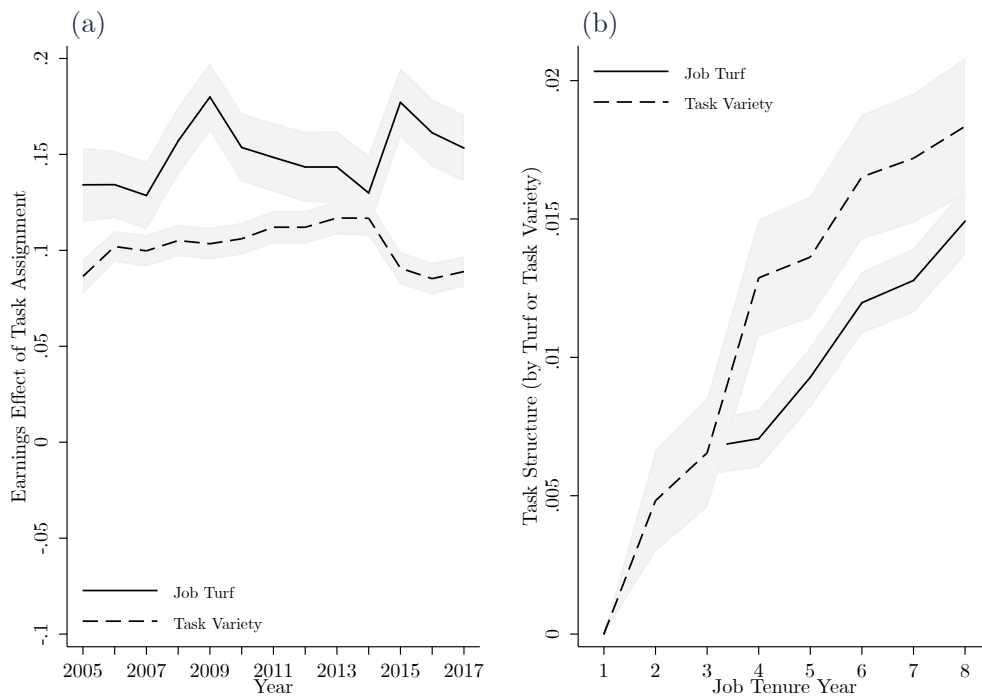
Note: Coefficients show the percentage point increase in each OLMS activity predicted by online job postings for that job title and labor union including duties in the listed categories. OLMS activity categories are used in the main analysis; job responsibilities are derived from hand-coding job postings corresponding to each matched OLMS union job. For more details on the job postings, see the Appendix.

Figure 4: Task Premiums for Union Employees, 2005-2017.



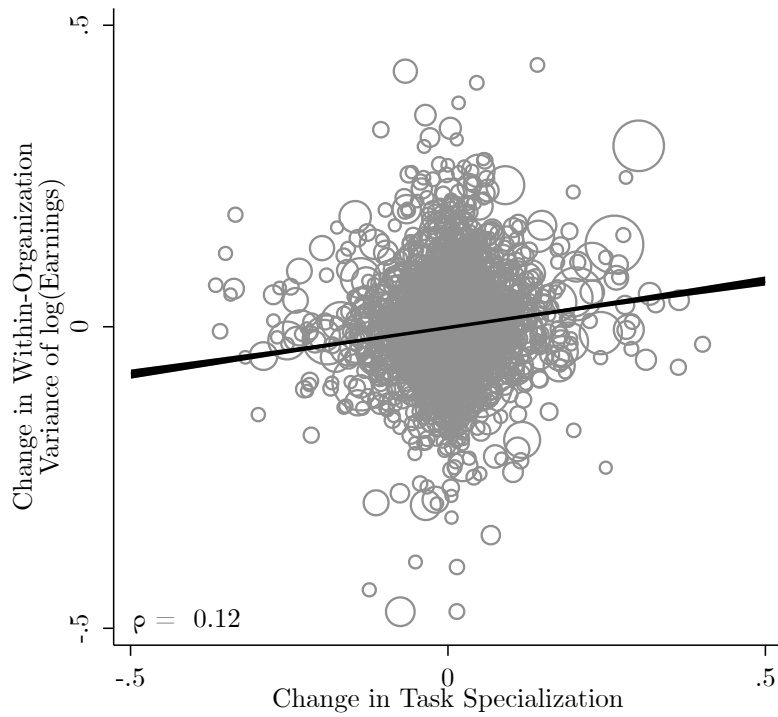
Note: Plotted estimates are conditional on worker by union fixed effects, tenure, industry experience, and logged establishment employment.

Figure 5: Task Structure (a) Earnings Premiums and (b) Tenure Trajectories.



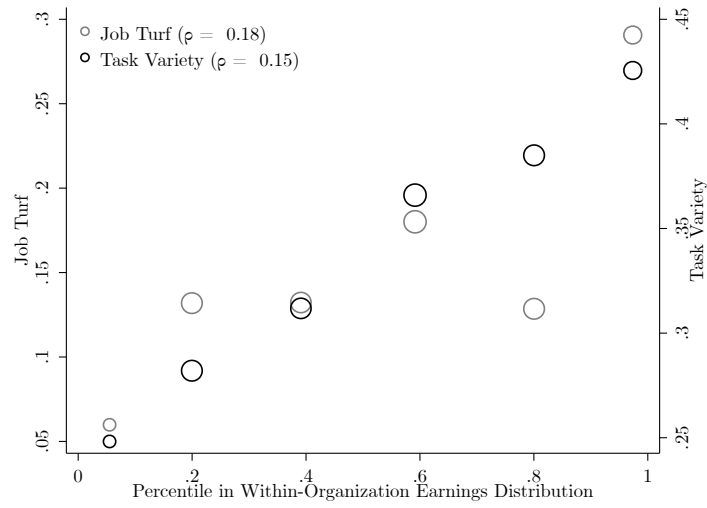
Note: Plotted estimates in (a) are conditional on worker fixed effects, task content, tenure, industry experience, and logged establishment employment. Plotted estimates in (b) are conditional on worker by union fixed effects, task content, tenure and logged establishment employment. Estimates are relative to first year of employment.

Figure 6: Increasing Division of Labor Predicts Increased Earnings Inequality.



Note: Task specialization aggregates the individual-level task variety measure into the entropy index, which measures the degree of sorting of task types across jobs. Points are scaled by union employment level.

Figure 7: Higher-paid Jobs Occupy Advantaged Positions in Task Structure.



Note: Within-organization earnings distribution is based off of the job effect, tenure, task content and residual earnings, with effects attributable to task structure removed.



Figure 8: Excerpt from Labor-Management Reporting Form.

SCHEDULE 12 – DISBURSEMENTS TO EMPLOYEES										FILE NUMBER:
(A) Name Last, First, MI		(B) Title	(C) Other Payer	(D) Gross Salary Disbursements (before any deductions)	(E) Allowances Disbursed	(F) Disbursements for Official Business	(G) Other Disbursements not reported in (D) through (F)	(H) TOTAL		
1 A										
B										
C										
I	Schedule 15 Representational Activities	%	Schedule 16 Political Activities and Lobbying	%	Schedule 17 Contributions	%	Schedule 18 General Overhead	%	Schedule 19 Administration	%
2 A										
B										
C										
I	Schedule 15 Representational Activities	%	Schedule 16 Political Activities and Lobbying	%	Schedule 17 Contributions	%	Schedule 18 General Overhead	%	Schedule 19 Administration	%
3 A										
B										
C										
I	Schedule 15 Representational Activities	%	Schedule 16 Political Activities and Lobbying	%	Schedule 17 Contributions	%	Schedule 18 General Overhead	%	Schedule 19 Administration	%
4 A										
B										
C										
I	Schedule 15 Representational Activities	%	Schedule 16 Political Activities and Lobbying	%	Schedule 17 Contributions	%	Schedule 18 General Overhead	%	Schedule 19 Administration	%
5 A										
B										
C										

Note: This page covers disclosures regarding employees of labor unions.

Figure 9: Excerpt from Survey on Interpretation of LM Forms.

First, think of someone working at your union who does primarily **representational** activities. In a typical week, how much time does this person spend on the following tasks:

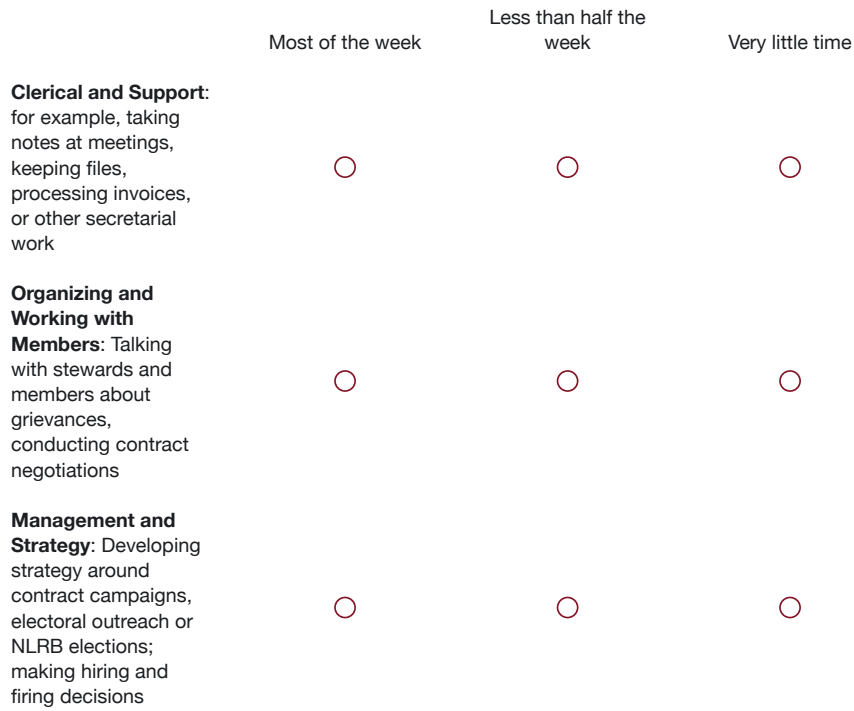
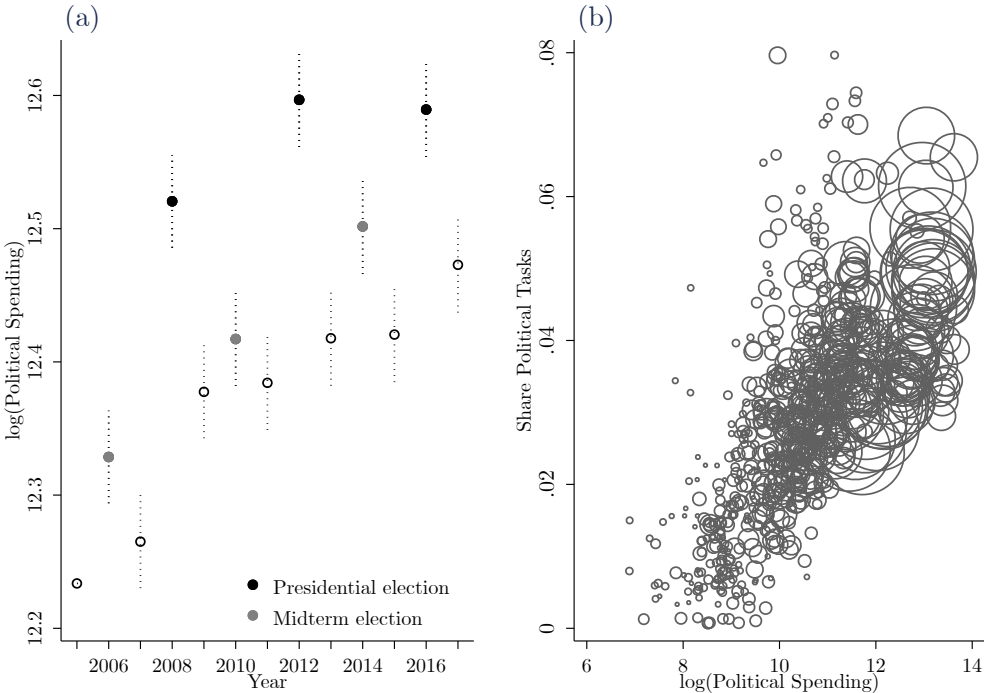


Figure 10: Elections, Union Political Spending and Union Employee Political Tasks.



Note: Unit of analysis for panel (b) is state-year.

Table 2: Job Examples by Skill Level of Task Content and by Task Structure

		Low Variety	High Variety
Non-college	Low Turf	Janitor	Assembly worker under job rotation
	High Turf	Assembly line worker	Plant electrician
College+	Low Turf	Breast cancer surgeon	General Practitioner
	High Turf	Pediatric neurosurgeon	Pediatric rheumatologist

Table 3: Descriptive Statistics

	Mean	SD	Min.	Max.
log(Annual Salary)	10.72	0.62	9.21	16.06
Task Variety	0.34	0.37	0.00	1.61
Job Turf	0.16	0.24	0.00	1.00
Share Political Tasks	0.05	0.15	0.00	1.00
Share Representational Tasks	0.55	0.41	0.00	1.00
Share Contributions Tasks	0.01	0.04	0.00	1.00
Share Overhead Tasks	0.21	0.36	0.00	1.00
Share Administrative Tasks	0.19	0.31	0.00	1.00
Tenure	6.05	4.16	1.00	18.00
Industry Experience	7.64	4.51	1.00	18.00
log(Assets)	16.22	2.24	4.56	20.96
log(Union Employees)	3.91	1.78	0.00	7.11
log(Union Members)	9.83	2.53	0.00	16.43
Co-workers' Task Variety	0.34	0.22	0.00	1.61
HHI	0.38	0.35	0.03	1.00
Observations	699481			

Source: OLMS.

Table 4: Effects of Co-workers' Task Variety on Job Turf

	(1)	(2)	(3)	(4)
Co-workers' Task Variety	-0.07*** (0.01)	-0.11*** (0.01)	-0.23*** (0.02)	-0.65** (0.25)
Task Variety		0.06*** (0.01)	0.18*** (0.02)	0.15 (0.15)
Fixed effects:				
Year	Yes	Yes	Yes	Yes
Individual X Union X Job title	Yes	Yes	Yes	Yes
X Fixed Worker Composition			Yes	Yes
X Fixed Task Quantities				Yes
Controls:				
Task Content Shares		Yes	Yes	Yes
Experience, Tenure		Yes	Yes	Yes
R <sup>2</sup>	0.90	0.90	0.94	1.00
Within-R <sup>2</sup>	0.00	0.04	0.09	0.16
Observations	575679	575679	67922	38695

Outcome is nodal worker's job turf. Standard errors are clustered at the city-state level and in parentheses. Fixed workers composition effects are defined by average worker fixed effects and employment count.

Source: OLMS.

\*  $p < .05$ ; \*\*  $p < .01$ ; \*\*\*  $p < .001$  (two-tailed tests)

Table 5: Effects of Task Structure on Earnings

	(1)	(2)	(3)	(4)	(5)	(6)
Task Variety			0.36*** (0.02)	0.12*** (0.02)	0.08*** (0.01)	0.08*** (0.01)
Job Turf			0.10*** (0.02)	0.09*** (0.01)	0.09*** (0.01)	0.08*** (0.01)
Share Representational Tasks		0.30*** (0.04)	0.25*** (0.04)	0.08*** (0.01)	0.07*** (0.01)	0.07** (0.02)
Share Political Tasks		0.31*** (0.04)	0.15*** (0.02)	0.02 (0.02)	0.04* (0.02)	0.07* (0.03)
Share Administrative Tasks		0.11*** (0.02)	0.02 (0.02)	0.01 (0.01)	0.01 (0.01)	0.02 (0.02)
Share Contributions Tasks		0.42*** (0.06)	0.01 (0.09)	-0.04 (0.03)	-0.03 (0.04)	-0.11 (0.09)
Tenure	0.03*** (0.00)	0.04*** (0.00)	0.03*** (0.00)	0.00 (0.00)	0.01** (0.00)	0.01** (0.00)
Industry Experience	0.02*** (0.00)	0.02*** (0.00)	0.01*** (0.00)	0.01*** (0.00)	0.01*** (0.00)	0.01*** (0.00)
Fixed effects:						
Union X Year	Yes	Yes	Yes	Yes	Yes	Yes
Individual X Union				Yes		
Individual X Union X Job title					Yes	Yes
City X Main Task X Year						Yes
R <sup>2</sup>	0.36	0.39	0.42	0.83	0.87	0.88
Within-R <sup>2</sup>	0.11	0.15	0.19	0.01	0.01	0.00
Observations	694325	694325	694325	644871	572496	561401

Outcome is logged earnings. Sample size varies across models due to the exclusion of singleton observations from fixed-effects models. Standard errors are clustered at the city-state level and in parentheses.

Source: OLMS.

\*  $p < .05$ ; \*\*  $p < .01$ ; \*\*\*  $p < .001$  (two-tailed tests)

Table 6: Effects of Task Structure on Worker Earnings, by Labor Market Concentration

	<0.08 HHI	0.08 to 0.60 HHI	>0.60 HHI	Continuous Interaction
	(1)	(2)	(3)	(4)
Task Variety	0.05*** (0.01)	0.08*** (0.01)	0.14*** (0.02)	0.06*** (0.01)
Job Turf	0.08*** (0.02)	0.10*** (0.01)	0.04** (0.02)	0.10*** (0.01)
Task Variety * HHI				0.07** (0.02)
Job Turf * HHI				-0.05* (0.02)
Fixed effects:				
Individual X Union X Job title	Yes	Yes	Yes	Yes
Union X Year	Yes	Yes	Yes	Yes
City X Main Task X Year	Yes	Yes	Yes	Yes
Controls:				
Task Content Shares	Yes	Yes	Yes	Yes
Tenure and Experience	Yes	Yes	Yes	Yes
R <sup>2</sup>	0.88	0.88	0.89	0.88
Within-R <sup>2</sup>	0.00	0.00	0.01	0.00
Observations	134248	280518	130821	561401

Outcome is logged earnings. HHI breaks are at the 25th and 75th percentiles of the distribution.

Standard errors are clustered at the city-state level and in parentheses.

Source: OLMS.

\* p < .05; \*\* p < .01; \*\*\* p < .001 (two-tailed tests)



Table 7: Effect of Exogenous Task Demand Change on Earnings

	Task Variety			Job Turf	
	Reduced Form	First-Stage	IV	First-Stage	IV
Share Political Tasks * Share Nearby Political Spending	-0.02** (0.01)	-0.12*** (0.02)		-0.06*** (0.02)	
Task Variety			0.18*** (0.05)	0.03** (0.01)	0.06*** (0.01)
Job Turf	0.10*** (0.01)	0.14*** (0.01)	0.07*** (0.01)		0.33* (0.13)
Fixed effects:					
Individual X Union X Job title	Yes	Yes	Yes	Yes	Yes
Union X Year	Yes	Yes	Yes	Yes	Yes
City X Main Task X Year	Yes	Yes	Yes	Yes	Yes
Controls:					
Task Content Shares	Yes	Yes	Yes	Yes	Yes
Tenure and Experience	Yes	Yes	Yes	Yes	Yes
Wald F-stat.			36.01		12.89
Observations	463169	463169	463169	463169	463169

Outcome in first-stage is task variety or job turf. The instrument is the share of union disbursements on political spending among unions in the same city (leaving out the nodal union), interacted with each workers' share of political tasks. The main effect of share of nearby political spending is absorbed in the fixed effects and main effect of share of political tasks is in controls. Standard errors are in parentheses and clustered at the city level, to account for geographically correlated errors in the share of nearby political spending instrument.

Source: OLMS.

\*  $p < .05$ ; \*\*  $p < .01$ ; \*\*\*  $p < .001$  (two-tailed tests)

Table 8: Effects of Division of Labor on Union Productivity

	log(Revenue/Worker)			log(Revenue/Wage bill)		
	(1)	(2)	(3)	(4)	(5)	(6)
Task Variety	-0.04** (0.01)	-0.03* (0.01)	-0.03* (0.01)	-0.06*** (0.01)	-0.07*** (0.02)	-0.08*** (0.02)
Job Turf	0.06** (0.02)	0.03 (0.02)	0.02 (0.02)	-0.06** (0.02)	-0.08** (0.03)	-0.08** (0.03)
Fixed effects:						
Union	Yes	Yes	Yes	Yes	Yes	Yes
Year	Yes			Yes		
Year X City		Yes	Yes		Yes	Yes
Year X Parent			Yes			Yes
Controls:						
Union Average Task Content Shares	Yes	Yes	Yes	Yes	Yes	Yes
log(Assets), log(Other Spending)	Yes	Yes	Yes	Yes	Yes	Yes
log(Employees), log(Members)	Yes	Yes	Yes	Yes	Yes	Yes
R <sup>2</sup>	0.91	0.94	0.94	0.80	0.85	0.86
Within-R <sup>2</sup>	0.65	0.66	0.65	0.28	0.29	0.29
Observations	50137	38988	38484	49675	38573	38080

Outcome is logged revenue per employee earnings. Sample size varies due to the exclusion of singleton observations from fixed-effects models. Standard errors are clustered at the city-state level and in parentheses.

Source: OLMS.

\*  $p < .05$ ; \*\*  $p < .01$ ; \*\*\*  $p < .001$  (two-tailed tests)

Table 9: Effects of Task Structure on Worker Earnings, by Organization Size

	15 or Fewer	15 to 100 Employees	>100 Employees	Continuous
	(1)	(2)	(3)	(4)
Task Variety	0.10*** (0.02)	0.11*** (0.01)	0.06*** (0.02)	0.17*** (0.03)
Job Turf	0.11*** (0.01)	0.03* (0.01)	0.03 (0.03)	0.14*** (0.02)
Task Variety * log(Union Employees)				-0.02** (0.01)
Job Turf * log(Union Employees)				-0.03*** (0.01)
Fixed effects:				
Individual X Union X Job title	Yes	Yes	Yes	Yes
Union X Year	Yes	Yes	Yes	Yes
City X Main Task X Year	Yes	Yes	Yes	Yes
Controls:				
Task Content Shares	Yes	Yes	Yes	Yes
Tenure and Experience	Yes	Yes	Yes	Yes
R <sup>2</sup>	0.93	0.87	0.85	0.88
Within-R <sup>2</sup>	0.01	0.00	0.00	0.00
Observations	161000	168729	222594	561401

Outcome is logged earnings. Sample size varies due to the exclusion of singleton observations from fixed-effects models. Standard errors are clustered at the city-state level and in parentheses.

Source: OLMS.

\* p < .05; \*\* p < .01; \*\*\* p < .001 (two-tailed tests)

Table 10: Robustness Tests of Task Structure on Earnings

	Fix Union Tasks	No First, Last Year	No B25%	No First, Last, B25%	Only Managers	No Managers
	(1)	(2)	(3)	(4)	(5)	(6)
Job Simplicity	-0.11** (0.03)	-0.02*** (0.01)	-0.02*** (0.00)	-0.01* (0.00)	-0.09*** (0.03)	-0.08*** (0.01)
Job Turf	0.08*** (0.02)	0.03*** (0.01)	0.03*** (0.00)	0.01*** (0.00)	0.08** (0.03)	0.07*** (0.01)
Fixed effects:						
Individual X Union X Job	Yes	Yes	Yes	Yes	Yes	Yes
Union X Year	Yes	Yes	Yes	Yes	Yes	Yes
City X Main Task X Year	Yes	Yes	Yes	Yes	Yes	Yes
Fixed Union-level Tasks	Yes					
Controls:						
Task Content Shares	Yes	Yes	Yes	Yes	Yes	Yes
Tenure and Experience	Yes	Yes	Yes	Yes	Yes	Yes
R <sup>2</sup>	0.96	0.96	0.94	0.97	0.89	0.87
Within-R <sup>2</sup>	0.00	0.00	0.00	0.00	0.01	0.00
Observations	95054	404175	424890	335330	83757	440882

Outcome is logged earnings. Sample size varies due to the exclusion of singleton observations from fixed-effects models. Standard errors are clustered at the city-state level and in parentheses.

Source: OLMS.

\*  $p < .05$ ; \*\*  $p < .01$ ; \*\*\*  $p < .001$  (two-tailed tests)