Research Frontiers in the Institutional Analysis of Work

John S. Ahlquist[1]

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What it means to "have a job" or "go to work" is changing. New technologies have driven down the costs of processing and transporting objects and information, leading to new products and more complex international supply chains. There are new opportunities and reduced poverty in China and India alongside widening income gaps and geographic polarization in economic opportunity (Moretti 2012). Work arrangements feel more precarious, yet we have only a limited grasp what these changes imply for everything from regulation to political institutions. There is exciting work to be done, but we will need to revisit theory and overhaul empirical tools. I borrow from the new "task approach" to labor economics and institutional political economy to both identify theoretical lacunae and generate ideas about how research might proceed.

Tasks & Contracts

Tasks, jobs, and occupations are three concepts integral to understanding the structure of work. Their distinction is also core to new "task approach" to labor economics. As highlighted below, the task approach and institutional analysis have yet to be integrated, providing fertile ground for theoretical work.

Acemoglu and Autor (2011) define a *task* as "a unit of work activity that produces output." Tasks can be assigned to a worker, team, or capital (e.g., an algorithm). Importantly, the combination of tasks used to produce any particular product as well as assignment to workers or capital evolves endogenously. *Skills* are human abilities that are, at least in part, learned and associated with the performance of a particular task. There is no necessary relationship between skill in one task and skill in another, although correlation across skills may increase incentives to bundle tasks together.

A *job* is a contract that defines the bundle of tasks a worker will do and the terms under which she agrees to do them. Contractual duration is a theoretically important job feature. For simplicity we can think of jobs as either *project-based*, ending when the worker completes her duties, or *indefinite*, ending only when the parties agree to go their separate ways. Job duration will, in turn, reflect varying governance arrangements.

I define an *occupation* as the tasks a worker *believes* she will be able to perform for a roughly stable wage for an extended period of time. The emphasis on time and expectations reflects how an occupation is more than just a job. An occupation can form the basis for social

[1] Associate professor, School of Global Policy and Strategy, UC San Diego: jahlquist@ucsd.edu. While writing this essay I benefited from a fellowship at Stanford's Center for Advanced Study in the Behavioral Sciences.

organization, such as labor unions or political parties, and may be associated with a person's family or social stature, echoing the earlier sociology of work and class. How workers form and update occupational expectations is a wide-open research area.

Institutional Analysis of the Organization of Work

Williamson (1985) provides one of the few institutional analyses of work. Transactional frequency, specificity of assets to a particular relationship, and uncertainty are core to his theory of governance and employment structure. When viewing Williamson's approach in light of technological change and the task approach to labor economics, we confront an immediate question: what determines which tasks are bundled together into jobs? And our thinking on this topic has implications for governance: what jobs are "inside" the firm?

Why are tasks bundled into jobs?

Understanding why tasks are bundled into jobs is critical for thinking about the implications of technological change. Unfortunately, we do not have a full theoretical scaffolding for answering this question. Contract theory, notwithstanding work on optimal contracts and multitasking, remains silent on why some tasks might be bundled or who would optimally make such a decision. The task-based approach has focused on the dynamic assignment of workers or capital to particular tasks. Weaving these strands together with a serious analysis of institutions is a project for the future. An important missing ingredient is power: who has the ability to decide on bundling and job contracts?

We can form some preliminary intuition to guide subsequent modeling and think through the implications of technological change. Unbundling jobs into smaller sets of tasks should make it easier to allocate these tasks to the least expensive workers or capital. On the other hand, the incentives to bundle tasks together can come from many directions. For example, there are incentives to bundle together tasks that are highly complementary tasks or involve knowledge spillovers in training. Hiring for tasks requiring specialized skills can entail screening costs. Some skills are easier to screen for than others. To the extent people qualified for the easy-to-screen task are more likely to be competent at harder-to-screen tasks we should see those tasks bundled. Drawing on the discussion in Williamson (1985: ch.9), separating tasks and assigning them to different units can incur transportation costs, leakage, and the need to maintain inventories. Tasks requiring team effort typically rely on coordination, communication, and leadership (Ahlquist and Levi 2013). Bundling such tasks (and teams) together can economize on communication and leadership costs, especially when job contracts are incomplete.

Particular bundles of tasks could be idiosyncratic to a firm (Lazear 2009). After all, firms, even in the same industry, differ markedly in their production processes, organizational structures, and "corporate cultures." As a result, a worker's knowledge and ability to perform a particular

task bundle may itself be a form of firm-specific skill. Exploration of this topic, especially in relation to technological change, is a wide-open area for research.

Which jobs are "inside" the firm?

Given a set of well-defined jobs, Williamson describes the type of governance arrangements expected to form as a function of asset specificity and frequency of interaction. Figure 1 distills these insights into a simple set of expectations about contract types which we can then use to think through the effects of new technologies. The vertical axis depicts the frequency of interactions *relative to the cost of transacting in the labor market* while the horizontal axis represents the extent to which tasks bundled into these jobs entail specific skills, keeping in mind that a particular task bundle could, itself, be a firm-specific skill.

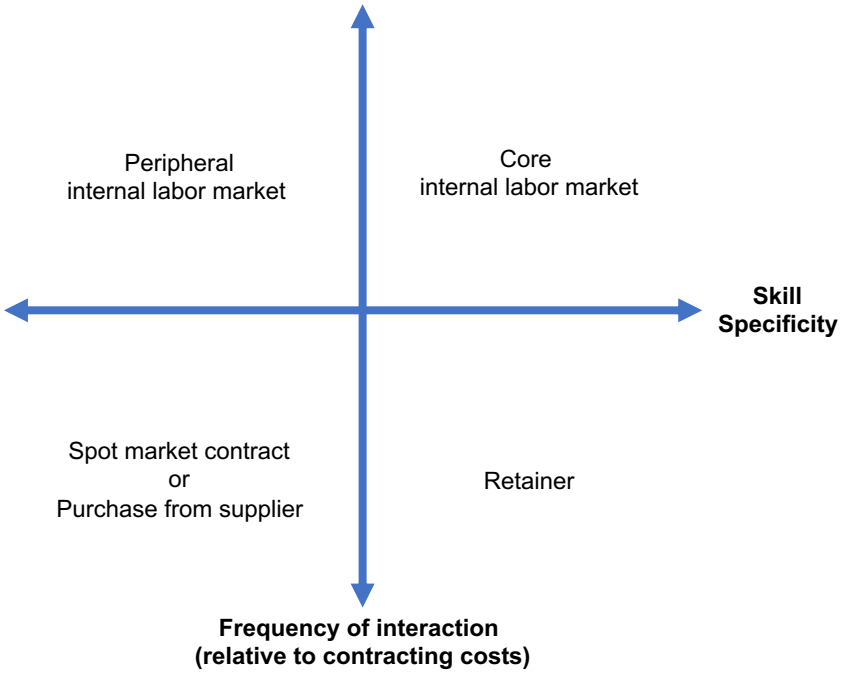

Figure 1: A transaction cost approach to labor contracting

The northeast quadrant represents jobs involving skills specific to the firm. Because skills are inalienable and unexpected events require adaptation, parties cannot write contracts that assign property rights in ways that completely protect workers from exploitation or firms from hold-up problems. This set of jobs will require more complicated governance arrangements, perhaps including public policy and labor market regulations, coupled with indefinite and incomplete contracts. These jobs form the core of the firm's "internal labor market." Jobs in the southeast quadrant require some relationship-specific knowledge but are required relatively infrequently. Here it makes more sense for the firm to pay to retain some of the worker's bandwidth, and then hire on a project basis when the need arises.

Jobs in the northwest quadrant involve tasks requiring little firm-specific knowledge but occurring sufficiently frequently that it makes sense to contract on an indefinite basis. Although these jobs are part of a firm's internal labor market, they are peripheral to its governance. The internal labor market arrangements that emerge for workers performing tasks in the northeast quadrant frequently spillover to jobs in the northwest, whether due to norms of fairness, attempts by the firm to signal to workers, or simple administrative simplicity. As market transaction costs fall, jobs that do not rely on firm-specific skills are those most susceptible to being pushed "outside" the firm and into the southwest quadrant where the spot labor market for project-based work determines wages, etc.

Legal institutions and regulatory requirements affect the cost of hiring workers under different contractual arrangements. Active labor market policies may make it easier for firms to screen for workers and risk training them. Bargaining with occupation- or industry-based labor unions produced rules governing union recognition, job definitions, and the extent to which union contracts extend across firms (Ahlquist 2017). Employers are sometimes required to collect payroll taxes and social insurance contributions, but only for certain types of workers. Access to health insurance may be linked to a specific employment relationship and only be available for certain workers or in firms of sufficient size. Firm size itself is frequently defined in terms of the number of workers, weighted by their contractual arrangements (e.g., "full-time equivalent"). These regulatory arrangements create incentives for firms to differentially favor certain types of contracts, adjust the mix of capital and labor, or restrain their scale. French regulations imply a large increase in the regulatory burden once the 50th employee is hired; there is a clear discontinuity around 50 workers in French administrative data (Garicano *et al.* 2016). Employers are systematically reclassifying employees into supplier-like relationships outside the firm, even when the actual job has not changed (Weil 2014; Goldschmidt and Schmeider 2017). The early economics of the "sharing economy" is, in some sense, predicated on regulatory arbitrage in which workers governed under one contractual arrangement ("independent contractor" Uber drivers) supplant regulated workers (taxi drivers).

Changing technology and the organization of work

The technological changes since the 1970s are myriad, but their economic exploitation has produced six outcomes relevant for understanding labor contracting, remuneration, and regulation.

1. The cheaper and faster transmission and storage of information enables easier communication at distance.
2. Transportation and storage costs of goods have fallen, as have inventories and associated warehousing costs (Levison 2008).
3. Digital technologies make possible a variety of objects and services with high fixed costs of investment but small or zero marginal costs of production. Many of these same objects also have pronounced network effects. Both these attributes contribute to the emergence of winner-take-all competition between firms. In such an environment,

small marginal advantages can have outsized consequences for profits and even the viability of a firm.

4. Property rights in intellectual or analytic schema have become more valuable but harder to enforce.
5. More data storage and computational power puts a larger set of tasks under threat of automation.
6. There is ubiquitous but fragmented ability to track individuals through time, space, and social contexts. Personal information and digital behavior are valuable in at least two respects. First, such data allow for more targeted marketing and advertising. Second, such data are the "training set" for constructing ever more accurate machine learning algorithms, further enabling automation—data as encoded labor.

These technological shifts, when viewed through the lens of transaction costs, imply a strong incentive for firms to unbundle jobs into smaller sets of tasks and adjust their contracting decisions accordingly. Lower communication and transport costs make bigger pools of labor available. Coordination and monitoring is cheaper and easier. And search and contracting costs fall rapidly, especially for tasks with relatively simple quality metrics. Firms that more efficiently allocate tasks to cheaper labor or capital may have that added advantage that makes the difference in a winner-take-all environment. Arbitrage across regulatory environments may also pay greater dividends.

Falling transaction, transportation, coordination, and monitoring costs alongside simplified jobs imply that there is reduced scope for firms' complicated internal labor markets. Jobs in Figure 1's northwest quadrant can now be more easily filled using contractors or spot labor markets. As jobs decompose into constituent tasks, firm-specific task bundling is less relevant; some jobs in the northeast quadrant of Figure 1 will migrate into tasks in the southwest. Understanding whether firm-specific task-bundling is prevalent will be important for understanding the scale of these changes.

It seems likely that workers performing the outsourced or unbundled tasks should see lower wages and increasing economic risk. But those workers remaining in indefinite contracts inside firms will see the value of firm-specific skills grow as they become responsible for working with more outside suppliers of labor and product. In a winner-take-all environment, we should see greater variance across firms in worker pay and perks along with aggressive efforts to minimize insiders. New work documents this increased inter-firm pay variance (Song *et al.* 2017).

The decomposition of jobs into tasks has dynamic implications. Substitution of capital for labor will be easier, both because the tasks are simpler to encode and because the workers themselves are, essentially, providing the data that the robots need to replace them. Jobs formerly requiring teams to jointly complete several tasks can be split into discrete chunks, reducing agency costs and complex contracting and governance arrangements. Taken to its extreme, this logic implies a new Taylorism, in which each job is progressively decomposed, analyzed, encoded, and then assigned to the person or machine who will perform it at the lowest cost. This may result in aggregate efficiency improvements and certainly seems to

coincide with the increasingly complex web of international supply chains in many industries. But it also implies that occupations are less stable and investments in skills and training harder to make.

Research frontiers

This admittedly preliminary outline suggests numerous research directions. I highlight property rights, data needs, the relationship between work arrangements and public policy, and the consequences for collective action and politics.

Property rights and data labor

A critical aspect of the new work environment is property rights over personal data and past work product associated with specific activities. The early architecture of the Internet—one-way linking that obscures the origin of any content or idea—prevents assertion of property rights (Lanier 2014). Those doing the work used to train algorithms go largely uncompensated. This architecture enables a world where user data and past work product can be acquired at very low marginal cost, leading to "free" services like Google and Facebook. This same structure and network lock-in effects also has a tendency toward winner-take-all dynamics.

Early technical choices embodied in code and hardware architectures turned out to be political-economic institutions. They are humanly devised rules that embed assumptions about property rights, communication structure, and even our collective goals. Once entrenched these rules are generally outside the ability of a particular player to alter unilaterally. How can we analyze the optimal allocation of property rights in such a context? If we are interested in creating a functioning market in "data labor" (Arrieta Ibarra *et al.* forthcoming) what are the necessary political institutions? Which of these are technically feasible and what are the political conditions that can support them in equilibrium? What are the distributional consequences? Alternatively, we might imagine that we currently exist in a "data fishery" whereby firms are all scooping up as much as possible, with no regard for sustainability. What governance institutions would prevent such abuse? Addressing these issues will require us to look for institutions in new places and build new types of research teams.

Measurement and data collection

The assertions above are just that; they require empirical validation. This will require measurement of tasks and contracts over time, matched at the worker and firm levels. The tasks performed in different jobs will evolve dynamically and a particular worker could be engaged in multiple contracts at once or in short order. Workers have skills that will not be visible simply by looking at educational attainment or even the jobs currently filled. How can we identify places or sets of workers' skills that are underexploited?

Our existing data infrastructure—bound up in a mid-20th Century understanding of employment, occupation, and household—is generally not up to the task. Standard tools, such as surveys of workers or firms are already incomplete and increasingly expensive. Consequently, existing evidence for changing firm boundaries and labor contracts is anecdotal (Weil 2014) or comes from the few national contexts with very rich administrative data (e.g., Goldschmidt and Schmieder 2017). We need large-scale, long term effort to build new "socio-economic weather stations" that do more than link government datasets. We will need to triangulate from a variety of new sources to produce temporally and geographically fine-grained images of the tasks workers are performing and the contracts under which they operate.

The organization of work, public policy, and regulation

There is a mismatch between the evolving organization of work and existing public policies. For example,

- *Job classification*: labor market regulations effectively assume that people are either employed workers inside a firm or some type of capitalist business owner. This dichotomy unintentionally incentivizes regulatory arbitrage, which then has the perverse effect of creating businesses (e.g., Uber) based, in part, on this existing regulatory mismatch. When and how will regulatory institutions adapt? How do political institutions affect this process?
- *Minimum wage laws* are political winners, but they are typically defined in terms of hourly minima and restricted to certain classes of employment. Moreover, enforcement, at least in the United States, appears to be deteriorating (Weil 2014). What does an effective wage floor look like in a world of task-based contracting? What are its costs?
- *Unemployment, disability, and old age insurance* act as economic stabilizers over the business cycle and as insurance for investment in skills. But these programs are often funded through payroll taxes on certain classes of employees, excluding others from coverage and benefits. How can these programs be altered to reflect new contractual realities? If governments were instead to make open-ended but strictly limited promises to workers (e.g., a universal basic income) how would such promises be made credible?
- *Skills and training*: Evolving corporate structures and production processes presume a steady supply of adaptable workers with the measurable skills that can be matched to tasks. Firms face a "common pool" problem: they all benefit from a well-trained workforce but would prefer that someone else fund that training and take the risk of betting on a specific skill set. Where will worker training and expertise come from? Who will bear the risks of investing in skills when the cycle to obsolescence is accelerating? Does social insurance still work in this domain, especially with a graying workforce?
- *Monopoly and anti-trust* analysis traditionally focused on product markets. But the growth of large "core" firms and winner-take-all environments raises the danger of monopsony power in the labor market (Azar *et al.* 2017). The theory, empirics, and

jurisprudence in this area are only now being developed. For example, what classes of workers (or contractual relationships) should be subject to non-compete clauses? The notion of firm-specific knowledge seems relevant here.

Collective action & politics

Concentrated corporate power in politics can ultimately be a threat to the institutions underpinning "open access" societies (Levi *et al*. 2017, Zingales 2017). The extent to which firms attempt to coordinate, monitor, or react to their workers' political behavior is one area receiving renewed interest (Hertel-Fernandez 2018).

Occupational identities and the structure of work have formed the basis of political contestation and party formation in the developed world (Lipset and Rokkan 1967). Labor unions, key actors in this process, can sometimes organize political action, but long-term interactions and a sense of occupational or class community are critical (Ahlquist and Levi 2013). The decomposition of jobs into tasks, perhaps performed remotely and in parallel, makes it more difficult for workers to see where they fit in the larger production process and who might be in a similar position. Turnover is high and time horizons are short, reducing the attractiveness of exercising "voice." Some workers are geographically fragmented and politically isolated (Moretti 2012). All these attributes work against effective collective action organized around stable occupational identities. What organizational alternatives will emerge?

How will various political systems react? Early work in this area indicates that existing political institutions will mediate these changes (Iversen and Soskice 2015). It may be that absent coherent occupational or class groups, political conflict will shift to the "second dimension" of identity politics, nationalism, and nativism. How groups form "mental maps" of the political and economic world when occupation is no longer an organizing principle is an open question.

We confront numerous changes to the organization of work and workers. The institutionalist perspective, with its emphasis on dynamic, adaptive efficiency, attention to historical context, and recognition of informal norms and institutions, is well-placed to produce important contributions.

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