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RISK GOVERNANCE AND PRECARITY IN THE SCHEDULING PROCESS:

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Table of Contents

List of Tables

List of Tables (continued)

List of Figures

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Abstract

This dissertation examines the origins, functions, and effects of precarious schedules—characterized by unpredictable timing or hours of work—in the US labor market. I focus on the retail sector, which has drawn scrutiny for unstable scheduling practices, such as on-call shifts and variable part-time hours, that compound more familiar problems of low wages and inadequate benefits for retail workers. My dissertation advances sociological understanding of this topic by theorizing schedules as risk governance arrangements, reconceptualizing precarity in terms of frustrated expectations, and conducting novel analyses of the causal effects of specific types of schedules. I evaluate the thesis that unstable scheduling provides advantages for employers in the short term, but can be counterproductive in the longer term by undermining commitment and skill formation in the employment relationship.

I develop a model of work as an option that formalizes and refines the notion of risk shifting from employers to workers through unstable scheduling. Unlike a secular process of externalizing risks, unstable schedules function as a call option, allowing employers to realize potential gains while avoiding anticipated losses to transacting for available labor. This contingent and asymmetric arrangement gives employers flexibility but precludes mutual commitment to a consistent schedule. I argue that commitment and consistency promote the formation of human and social capital that can improve performance and well-being at work. I conceive of the trade-off between optionality and commitment in the scheduling process as a reflection of the dual character of labor as a cost of production and a productive asset.

The dissertation comprises three empirical studies. The first study analyzes data from the National Longitudinal Survey of Youth 1997 Cohort to identify compensation penalties for unpredictable and unstable schedules. The second study traces the emergence of a precarious retail labor force through historical documents, statistics, and secondary research spanning 1900–2019. The third study exploits a field experiment and high-frequency administrative data from the Stable Scheduling Study to analyze the relationship between consistency and labor productivity in twenty-eight clothing stores. I find mixed results that nonetheless shed light on the governance of risk in the scheduling process. Workers with precarious schedules generally fare worse in the labor market than otherwise comparable workers with more stable schedules. But modest changes in scheduling stability among treatment stores did not significantly affect store performance as measured by quarterly sales per labor hour.

Chapter 1. Flexibility, Commitment, and Risk: A Framework for Evaluating Working Time Arrangements

Flexibility is a watchword of our time. Understood as adaptability to change or openness to alternatives, flexibility seems imperative in a social world characterized by technological dynamism, global interconnection, and proliferating options for how to spend one's time. This sense of contemporary society as especially fluid and uncertain finds expression in theories of "flexible accumulation" (Harvey 1989), "liquid modernity" (Bauman 2000), and "risk society" (Beck 1997). Flexibility accords as well with the neoliberal ideal of *homo economicus,* continuously assessing and making choices with the aim of maximizing the benefit to his individual or household. At a time of uncertainty and flux when every course of action may be reappraised in light of new information, flexibility is celebrated as a virtue akin to prudence (Sennett 2006).

The value of flexibility is recognized and reaffirmed in many situations where planning or scheduling is involved. In personal relations, flexibility is typically invoked to offer or request accommodation for potential schedule conflicts. It is common courtesy to "be flexible" in making plans with friends, for instance, by deferring to the schedule preferences of whoever has the most extensive or rigid demands on their time. In commercial contexts, flexibility is monetized and traded—for instance, when an airline offers vouchers for passengers willing to defer scheduled travel. Flexibility can also be purchased in advance, as when a traveler pays a premium for the right to cancel or reschedule reservations without further penalty. Perhaps the most sophisticated means of valuing flexibility is the options market, where financial traders buy or sell potential claims on assets without the obligation to actually transact for these assets (Meister 2021; Options Institute

1999). Options contracts express the value of flexibility in their price or premium, which is an increasing function of how far in the future they extend and how volatile the price of the underlying asset. Whether offered freely to a friend or shrewdly priced to market, flexibility has value because it transfers or extends discretion in decision-making.

Given how precious and pervasive flexibility appears in contemporary society, it is understandable that much of the sociological literature regards flexibility as an attractive feature of new or progressive work arrangements. Work-life scholars document the benefits of "flexible work schedules" in accommodating the worker's family or other obligations outside of work (Glauber 2011; Golden 2008; Goldin and Katz 2011). Organizational scholars evaluate the performance of "flexible firms" that iterate or decentralize decision-making to a greater extent than traditional bureaucracies (Fligstein 2001; Kalleberg 2001; Sabel 2006). Scholars of political economy explain the advantages of "flexible specialization" over mass production strategies in highly competitive or dynamic product markets (Hall and Soskice 2001; Piore and Sabel 1984). In each of these fields, the mainstream literature views flexibility from the standpoint of decision makers facing multiple, more or less uncertain, courses of action.

What these positive accounts tend to neglect are the spillover effects of flexibility beyond the focal actor or short-term outcome. Flexibility may have second-order or longer-term costs, particularly for those with little or no discretion in a given situation. One can change or cancel plans on a friend only so often before one violates norms of reciprocity and erodes trust in the friendship. Economic relationships may also suffer from one party's lack of commitment. A customer who repeatedly fails to show up for appointments may cost service providers revenue and lead them to deny service in the future. A client who cannot settle on a design may cause the designer to be reluctant to spend time on the client's account. As these examples illustrate, flexibility becomes

pathological when one exercises discretion to a degree or frequency that violates other parties' expectations. Such excesses of discretion disrespect the time or autonomy of those affected by the decision.

Yet even in a society that prizes flexibility, it is possible to check its arbitrary exercise and offset its spillover effects. In many situations, group norms and moral suasion are enough to set acceptable bounds on discretion (Hodson 2001). A conscientious decision maker takes into consideration others' expectations and the likely consequences of potential actions on one's social standing and relations. State institutions constitute a further bulwark, however permeable in practice, against egregious acts of selfishness and malice. Within the bounds of law and conscience, other sets of social arrangements constrain and compensate for the exercise of discretion. These arrangements run the gamut from the informal agreements of coworkers to cover one another's shifts to formal contracts specifying the terms of optional transactions. This is the realm of private governance, where interested parties make, negotiate, and contest claims on each other's time, efforts, and resources. It is the ground to the figure of the flexible decision maker (Martin 2011).

If we shift our focus from figure to ground, we see more clearly the conditions for and consequences of discretionary action. Where action is coordinated, involving multiple people, discretion presupposes a separation of decision making from execution. The principal exercises discretion to the extent that the agent does not. Where action is optional, discretion presupposes the availability of alternatives. Buyers have discretion in a purchasing decision insofar as they can choose among multiple suppliers or defer the purchase until a more opportune moment. However advantageous these arrangements may be for the decision maker, a sociological evaluation should take into account the interests of the counterparties. Is the agent fairly compensated for acting at the principal's discretion? Are the suppliers in a position to sell to other buyers or hold out for a future

sale? These questions raise broader issues about the quality of governance under which discretion operates. Is it consensual or coercive? Are the parties free to dissent or defect from the arrangement? Are the benefits of flexibility worth the costs?

This dissertation is a study of the social organization and ramifications of flexibility in an arena where it is routinely exercised and increasingly contested: working time arrangements. Flexibility in working time is demanded by employers and expected by employees in many industries, especially where workloads vary and work occurs outside of standard business hours. While flexibility is valued by many, it can refer to different, even contrary arrangements of discretion and accommodation. I develop a framework for distinguishing between schedule arrangements and identifying their effects, focusing on unstable schedules and their relation to job quality and performance in the US retail sector. I ask how unstable scheduling originates and operates, whom does it benefit, and what are its costs to social welfare?

Flexibility and Schedule Control

To lay the foundation for this study, I first address some common points of confusion in scholarly and public discussion around flexible work schedules. Chief among these is confusion over what is meant by schedule flexibility (Lambert et al. 2012; Snyder 2016). Who exercises discretion over what aspects of the scheduling process? Do different kinds of flexibility have equivalent effects? I introduce the concept of schedule control, which is central to recent work-life scholarship but has yet to be incorporated in broader labor market research and policy debates (Gerstel and Clawson 2018; Kelly and Moen 2007; McCrate 2018). I describe two ideal types of schedule flexibility—the freelancer and the on-call worker—who personify two ends of a spectrum of control from independence to dependence in the scheduling of work.

The freelancer works independently, deciding how to allocate his time among various tasks. These tasks may include producing "deliverables" for an existing client, pursuing new clients or business, or developing his professional skills and networks. The freelancer is subject to market discipline in the sense that he has to compete for business, satisfy clients, and maintain a professional reputation or brand (Vallas and Christin 2018). But within these constraints he has wide discretion over which projects to take on, when and how long to work, and what compensation to demand (Barley and Kunda 2004). The autonomy of the freelancer allows him to hedge against market risk, for example, by cultivating a portfolio of projects in case he loses or becomes stymied with any one of them (Fraser and Gold 2001).

The freelancer can use the autonomy he enjoys in scheduling his work to accommodate other demands on his time. So long as he keeps enough clients adequately satisfied, he can take off time to care for loved ones, volunteer his time with community organizations, engage in structured leisure activities, or do whatever else he pleases. The freelancer can make a firm commitment, say, to always take a child to sports practice or attend a political event scheduled during business hours. Clients may ask for meetings or deliverables on a conflicting schedule, but the freelancer is not obliged to accept these demands in order to earn a living. His independence allows him to set his own priorities and choose how to deal with the attendant risks. Perhaps he cultivates a clientele that respects his schedule or sets explicit terms of contract he can plan around. Whatever arrangement he chooses, the freelancer has a flexible schedule, precisely because it is his decision how to arrange it (Osnowitz and Henson 2016).

The on-call worker, by contrast, works at her employer's discretion. She might have a scheduled shift, but must "call in" a couple of hours before the start to confirm that she is needed. Or she might be called to work without warning, at whatever time the need arises. She might accept

any shift on offer because she needs the money, or because doing so is a condition of her

employment (O'Sullivan et al. 2019). Whatever her motivation, she depends on her employer to

realize the value of her working time. Even if she doesn't lose her job for declining a given shift, the

only way these hours can be "made up" is by working at another time when work is offered. In the

United States, the on-call worker typically is paid only for hours of work, not the time she is

available to work, not even when she is scheduled and required to call in (Alexander et al. 2015).

On-call work entails an asymmetric allocation of risk. The employer can avoid paying for

"idle" labor by canceling a shift when business is slow, but can also realize potential gains from

calling in available labor when business picks up (Lambert 2008). The on-call worker, however, loses

expected earnings when a shift is canceled and, unless she works overtime, only earns her regular

rate of pay when she is called into work. She also incurs certain costs to make herself available to

work. She is prevented from traveling too far, making firm plans, or doing anything else that would

make her unresponsive to her employer's call. Beyond these opportunity costs, she may spend time

and money to arrange transportation or childcare and to make herself "presentable" for work (Misra

and Walters 2016; Wolkowitz 2006).

Despite the differences between the freelancer and the on-call worker, they are often lumped

together in studies of "flexible," "nonstandard," or "alternative" work arrangements (Katz and

Krueger 2019; Howell and Kalleberg 2019; Smith 1997). Conventional labor market scholarship

treats flexibility as a characteristic of certain jobs or a benefit granted to particular workers. When it

does distinguish between different kinds and degrees of flexibility in work arrangements, it tends to

focus on the location and timing of work, contrasting onsite work during standard business hours

with work performed more or less frequently at home or at nonstandard times (Presser 2003;

Weeden 2005). Yet this notion of flexibility as deviation from standard employment leads to

ambiguous or contradictory results when researchers fail to distinguish the multiple sources and functions of this deviation (Kim et al. 2020; Spreitzer et al. 2017). To improve upon the conventional approach, recent scholarship differentiates flexible arrangements, especially in terms of schedule control (Kelly and Moen 2007; Henly et al. 2006; McCrate 2012).

I follow these scholars in placing control at the center of my study, distinguishing between the flexibility exercised by the freelancer and the flexibility to which the on-call worker is subjected. It is schedule control that allows the freelancer to divide his time among multiple projects while accommodating personal commitments. Conversely, the on-call worker's lack of schedule control limits her ability to make firm plans or secure a certain level of income. I seek to formalize and extend recent scheduling research by developing a risk governance framework. This framework analyzes how arrangements to exercise or limit schedule control also allocate economic risk and reward in ways that can be more or less efficient or socially desirable. As a counterpoint to the much-discussed benefits of flexibility, I elaborate on its costs, particularly the trade-off it entails with respect to commitment.

The paradox of flexible employment

The contrast between the freelancer and the on-call worker brings to light a paradox or contradiction at the heart of flexible employment. Flexible employment breaks the mold of the standard employment relationship, allowing working time to ebb and flow with business conditions or give way to other constraints. But so long as the worker remains dependent on the employer to offer work, flexibility can result in instability or idleness. Employer discretion obliges flexible employees to make themselves available to work without obligating the employer to make use of this capacity. Flexibility gives the employer options in the scheduling process but limits possibilities for how workers spend their time. Flexibility facilitates change and adaptation but precludes committed

forms of action. It lowers the barriers to deploying labor yet may diminish the depth of the work that occurs.

This paradox follows from the idea of flexibility as discretion. The employer exercises discretion over the scheduling process to the extent that the worker does not. Of course, workers can also exercise discretion in flexible employment, particularly when they face lower risks of job loss or economic hardship (Cansoy et al. 2020). Thus, discretion may be partial or even alternate to some degree, but still the exercise of employer discretion in a given instance is effective insofar as workers subordinate their own decision making. Whether this subordination is voluntary or coerced, it implies that flexibility in the employment relationship is exercised in an asymmetric manner (Breen 1997; Lambert 2008).

Flexible scheduling also involves a desynchronization or decoupling of potential and actual working time. If employees work a fixed schedule every week, then the time they expect to work is congruent with the time they do work. But if an employer exercises discretion over the timing and hours of work, then employees must be prepared to work at times when they are not in fact needed. The more flexible the schedule, the greater the decoupling of potential from actual working time (Snyder 2016; Rubery et al. 2005). This decoupling may be experienced even by workers with substantial control over their schedule, for instance salaried professionals who set their own hours but are expected to monitor and respond to urgent work demands (Perlow 2012; Zerubavel 1981). Availability for work implies some limitation on which nonwork activities workers can perform in the moment or commit to in advance. At the extreme, day laborers report for work at a certain time and place only to spend hours waiting idly for an offer of employment (Purser 2012). But even in less onerous situations, the time the worker is available for work is time the worker cannot dedicate to other pursuits.

Flexibility precludes commitment in scheduling arrangements. By commitment, I mean a social arrangement involving mutual obligation, which may be more or less strict. Commitment in the strict sense eliminates discretion, binding the committed parties to a definite plan. The more flexible the schedule, the more discretion it permits and the looser the implied commitment (DiTomaso 2001; Snyder 2016). If the employer makes a schedule in advance but routinely changes it on short notice, then the schedule is provisory rather than obligatory. Of course, the employer may require *employees* to adhere strictly to the schedule in effect, disciplining those who show up late or are absent without permission (Wood 2020). But subordination to the employer's demands does not constitute commitment to the schedule (Halpin 2015). Such commitment manifests only in the realization of the schedule jointly by employer and employee—that is, the adherence of actual working time to what was originally planned.

The tension between flexibility and commitment can be understood as a trade-off between the breadth and depth of what it is possible to accomplish through the employment relationship. Flexible employees who are readily engaged or discharged allow the employer to seize transient opportunities for profit and avoid anticipated losses (Houseman 2001; Cappelli and Keller 2013). An unexpected rush of customers may overwhelm the staff on hand unless additional help can be rapidly deployed. But employees who cannot rely on outside help may develop other ways of dealing with periods of increased demand. They may learn to do different tasks, perform the same tasks with more skill, or coordinate more seamlessly as a work group (Appelbaum and Batt 1994). Such learning takes time and effort that may not be invested without some assurance that it will pay off. Commitment can provide this assurance, promoting longer-term investments in the productivity of labor (Ton 2014).

In this way, we begin to see the practical limits of flexibility as an employer strategy. The paradox of flexible employment is less a contradiction in terms than a dilemma in action. It is only ever provisionally resolved with respect to a particular set of objectives and constraints. It is like the trade-off between flexibility and strength in athletics, epitomized by the limber gymnast and the bulky weight lifter. Both are highly specialized and may benefit from some degree of cross-training. But to evaluate their different training regimes, we must specify the terms of the competition. The optimal strategy is all the more uncertain in economic competitions where the field is open to new competitors and the terms subject to negotiation (Fligstein 2001). In such a field, form follows function, untethered to any fixed point of equilibrium.

Having sketched the contours of this argument, I now introduce a more systematic framework for analyzing flexible, unstable, and precarious work schedules. I formalize the distinction between flexibility and commitment as alternative strategies for generating value in the labor process. I incorporate concepts from political economy, finance, and organizational theory to clarify the risk-governing functions and potential effects of specific schedules.

A Risk-Theoretic Framework for Analyzing Working Time

Risk is endemic to the finite, fragile life of humans. We live on the precipice of an unknowable future, certain only that we will die. We move through life as though descending down a rock face, seeing the terrain we have traversed, but guessing at the footholds and hazards that lie below. The landscape is not fixed and solid, but continually erodes and shifts beneath our feet. We make this journey in the company of others, whom we rely on for guidance and support. We may tether ourselves to those around us to prevent a fall or separation. Yet these very ties can trip us up or pull us down. Our interdependence is a source of protection as well as vulnerability. On such a journey, we have no assurance of achieving an expected end or even staying on a chosen path.

Risks inherent to employment relations

Risk is fundamental to my theoretic framework. I define risk as the expectation of an adverse or beneficial outcome associated with future or otherwise uncertain occurrences.[1] In popular usage, risk has a purely negative valence, referring to the possibility of failure, loss, or harm (Kahneman 2011). In economic contexts, however, the "downside" risk of loss is often counterposed to the "upside" potential for profit or other rewards (Desai 2017). I evaluate scheduling risk mainly in economic terms, drawing on human capital and real options theory to conceptualize the interests of workers, employers, and others with a stake in scheduling arrangements. This approach relies on an extended metaphor between financial assets and the "fictitious commodity" of labor (Polanyi [1944] 2001). I conceive of working time under capitalism as the investment of labor in the production of goods or services with the expectation of a wage or other reward.

The labor market and production process expose workers and employers to an array of risks, both positive and negative. Some risks are inherent in capitalist relations of production; others stem from natural processes. Whatever the source, social context shapes the manifestation, perception, and response to labor market risks. In what follows, I identify several risks that are fundamental to the scheduling process, then later consider how they are shaped by specific institutional arrangements.

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[1] This definition foregrounds the subjective perception and evaluation of occurrences rather than objective probabilities. While we may be able to identify true parameters that correspond to these subjective constructs, this is not essential to the theory. Nor do I adopt the Knightian distinction between measured risk and unmeasurable uncertainty (Knight [1920] 1971). Selective measurement and accountability are important elements of risk governance that I use to explain how inefficient scheduling practices can persist in profit-seeking firms. Yet I conceive of this as a problem of organizational dysfunction and cognitive bias rather than ontological or epistemic limitation.

Unlike a fungible financial asset, labor is embodied and thus perishable. The worker can spend an hour at work or on other activities but cannot save this time for later use. The perishability of labor makes workers vulnerable not only to injury and illness but also shortfalls in demand, which can result in involuntary idleness—that is, unemployment or underemployment. Workers who quit a job or decline an offer of work must forgo earnings that they may not be able to recoup. While this risk can be mitigated by household savings, social insurance, a tight labor market, and so forth, workers often have a compelling interest in accepting work on whatever terms they are offered. The frictional costs of looking for and starting a new job compound the risk associated with a loss of hours or employment (Brand 2015).

Employers can exploit this situation to offer lower compensation or demand concessions from workers. In the absence of a secure alternative, workers may accept less favorable terms rather than run the risk of more substantial losses. If the worker does reject an unfavorable offer, the employer may also incur costs associated with recruitment and training. However, the greater scale and operating reserves of medium and large employers makes these costs easier to bear than the corresponding costs for the majority of workers they employ. This asymmetry in the riskiness of outside options gives the employer power over workers in the labor market (Bowles and Gintis 1993). In my framework, employer power follows from the perishability of labor and the risk of income loss. It does not require equilibrium unemployment, although it is compatible with theories of labor market monopsony and efficiency wages (e.g., Manning 2003; Shapiro and Stiglitz 1984). Even in a context where workers can be confident of their ability to quickly find another job, they may accept a less than competitive wage to avoid further search or idleness.

Human labor distinguishes itself from other factors of production by its reflexive nature. By reflexivity, I mean the development of productive capacity through the process of production.

Whatever goods or services they produce, workers acquire skill and knowledge as they work. I conceptualize this reflexive labor as a process of human capital formation or, more simply, learning.[2] On-the-job learning may be actively promoted through formal training or "quality improvement circles" (Appelbaum and Batt 1994), or it may occur informally through observation, conversation, and practice. It is difficult to measure directly, but can be inferred from increased labor productivity under stable conditions—technical, social, environment, etc. However, if conditions change appreciably, existing human capital may be rendered less productive or wholly obsolete.

Classic theories of human capital conceptualize the risk of obsolescence in terms of the "specificity" of skills to certain settings (Becker 1964; Iversen 2005). *Specific* skills have lower productive value in different jobs or firms, whereas *general* skills can be applied in a wide variety of settings. I extend this notion of specificity to encompass temporal as well as spatial variation. Human capital may be specific to temporal dimensions of the labor process, such as timing, duration, and regularity. Just as workers who change jobs may find their existing skills less useful in their new roles, workers who change shifts may perform below their accustomed level. A schedule-related drop in performance seems particularly likely when the labor process involves complex sequences or "rhythms" of activity that vary with the time of day or day of the week (Zerubavel

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[2] Although in economics, "human capital" is often used as a synonym for formal education or credentials, Becker frames his classic work on the subject in terms of on-the-job training, writing that "[t]heories of firm behavior, no matter how they differ in other respects, almost invariably ignore the effect of the productive process itself on worker productivity" (1964, 8). Marx, writing a century before, expresses a similar idea but in more active terms: "Labour is, first of all, a process by which man, through his own actions, mediates, regulates, and controls the metabolism between himself and nature. […] Through this movement he acts upon external nature and changes it, and in this way he simultaneously changes his own nature. He develops the potentialities slumbering within nature, and subjects the play of its forces to his own sovereign power." ([1867] 1990, 283).

1981). A nursing aide accustomed to working day shifts may find it challenging to switch to evenings, though the job is ostensibly the same.

I argue that temporal instability disrupts the formation as well as application of human capital. This claim is a dynamic corollary to the static notion of specific skills. If the productivity of labor depends on maintaining a specific setting or rhythm of work, then deviations from this norm should diminish productivity (Poletaev and Robinson 2008). I expect the size of this productivity shock to be a joint function of skill specificity and the magnitude or frequency of the deviation. To return to the example of the nursing aide, the disruptiveness of an evening shift is presumably greater for an aide who regularly works a day shift than for one who alternates between day and evening. Conversely, an aide who works an inconsistent schedule with a mix of day, evening, and night shifts may not develop shift-specific skills as quickly as a coworker with a more consistent schedule. Frequent schedule changes would seem most disruptive for skill formation, whereas changes that are large in magnitude, i.e., most dissimilar from the worker's normal schedule, could pose a greater risk of skill obsolescence or mismatch.

Temporal instability is a characteristic of capitalist economies, albeit one that takes quite different forms under various historical and institutional configurations. I return below to the question of how instability is generated and regulated in the contemporary US economy. For now, I merely observe that certain kinds of instability are widespread under capitalism and highly disruptive to the skill and knowledge embodied in labor.

The most dramatic examples of this dynamic are the economic crises that punctuate the business cycle. Such crises can provoke "creative destruction" whereby the failure of weak or stagnant firms allows for the reallocation of resources toward stronger rivals or innovative successors (Schumpeter [1942] 2008). But even if a crisis proves constructive for the

macroeconomy, it is far from clear that workers in general, much less the employees of failing firms, stand to gain from labor market upheaval. Workers who keep their jobs may still experience a reduction in hours during the crisis and slower wage growth in the aftermath. Workers who lose their jobs face an elevated risk of prolonged unemployment and reductions in earnings that can persist long into their subsequent careers (Brand 2015). An important mechanism for these "scarring effects" is the devaluation of human capital among workers unable to find a job that matches their experience and skills (Gangl 2006).

More localized kinds of instability occur more or less routinely in capitalist economies. Organizations expand and contract their operations as they are founded, restructured, and dissolved. Jobs are created, redesigned, and eliminated as workers enter, transition, and exit employment. Technologies and products are invented, reinvented, and superseded as production strategies and consumption patterns evolve and recombine. This turbulence creates opportunities but also obstacles for learning (Snyder 2016). The more rapidly workers churn through different jobs and organizations, the less time they have to develop or make use of skills specific to any one position (DiTomaso 2001). In the contemporary era, such disruption is often celebrated as an engine of innovation and opportunity (Fligstein 2001; Sennett 2006). But it also represents a threat to workers whose skills become outmoded or devalued after months or years of working time that cannot be recovered. The recurrence of this dynamic makes the risk of disruptions to human capital formation predictable to some extent. However, workers have limited means of insuring against this risk without the welfare state or other collective arrangements for pooling risks and redistributing income among workers at different stages of their career and areas of the labor market (Breen 1997; Iversen 2005).

I have emphasized the risks of idleness and skill devaluation as inherent to labor under capitalism. They reveal a fundamental asymmetry between the interests of workers and employers in maintaining stable employment. Insofar as workers earn their livelihood by investing time in a specific labor process, they have an interest in the stable continuation of this process for as long as they are willing and able to continue working. By contrast, employers' interest in stable production depends on market conditions since they can incur operating losses as well as profits.

Thus far I have emphasized the economic costs of instability for workers since this perspective is neglected in many discussions of the benefits of flexibility. But my goal is not to substitute a one-sided account of costly instability for a one-sided account of beneficial flexibility. Instead, I seek to incorporate both perspectives into a more encompassing framework for evaluating the functions and effects of unstable scheduling arrangements. The next step in constructing this framework is to develop the concept of risk governance and formalize a risk-theoretic model of flexibility and stability in the scheduling process.

Risk governance and schedule arrangements

I use the term *risk governance* to refer to a social process of anticipating and making provisions for hypothetical occurrences, especially with respect to the rights and obligations of the parties involved. The resulting arrangements may reflect narrow economic interests or broader concerns with status, fairness, or social welfare. Whatever the objective, such arrangements serve to coordinate social action and allocate anticipated costs and benefits among those with a stake in the outcome (Esping-Andersen 1999; Renn 2008). Understood in this way, risk governance is a general feature of social life and an important element of institutional theories in a variety of fields (Baldwin 1990; Beck 1997; Douglas and Wildavsky 1982).

Prior literature on labor market risk is mostly concerned with unemployment, illness, disability, retirement, or skill obsolescence (Jacoby 2001; Rehm 2016; Shuey and O'Rand 2004). These are instances of what I call *episodic risk*, associated with an extraordinary change in the worker's labor market status or capacity. Although some workers cycle through positions more rapidly than others—in and out of seasonal employment, for example—the arrangements governing these risks typically treat them as discrete, infrequent occurrences. Modern social insurance systems pool resources from the many individuals liable to episodic risk for the benefit of the few actually suffering from it. Yet existing systems are ill equipped to insure against routine risks of a more continuous or chronic nature (Esping-Andersen 1999; Rehm 2016).

Schedule instability is one such *routine risk* that may arise frequently, even daily, without a change in the worker's labor market status (Clawson and Gerstel 2014). Instability may also vary in magnitude, severity, and the extent to which the worker has control over various aspects of working time (Lambert and Henly 2014). It may originate outside the firm, with suppliers, competitors, clients, government officials, or the broader ecological and economic context. Risks may also arise within the firm's own operations and governance structures. Much of the scholarly and public discourse emphasizes fluctuations in demand as the primary source of scheduling risk (Boushey 2016; Kalleberg 2018; Lambert 2008). Schedule instability is often seen as a more or less direct reflection of variable demand, which seems endemic in consumer services (Bosch and Lehndorff 2005; Schneider and Harknett 2019). Routine risks related to unpredictable operations or employee behavior have received less attention (Clawson and Gerstel 2014). These risks may not be as obvious as those posed by slack demand, yet they can result in considerable costs for employers, especially through chronic absenteeism and turnover (Ton 2014; Boushey and Glynn 2012).

Work schedules function as risk governance arrangements insofar as they determine when, where, and on what conditions work occurs (Lambert 2008; Rubery et al. 2005). By arranging the rhythms and contingencies of work, schedules affect the results and relations of production and, by extension, other spheres of social life (Snyder 2016; Zerubavel 1981). Schedules represent more or less predictable arrangements for coordinating work and other activities amid the uncertainty and flux of social life.

To illustrate the risk-governing functions of unstable scheduling, consider the problem of fluctuating demand in retail sales. Because the customer is a "co-producer" of retail sales, the marginal productivity of retail labor depends on the ratio of customer demand to labor input (Betancourt 2004; Kesavan and Mani 2015). Reductions in demand decrease the marginal product, but not the marginal cost, of an hour of labor. Slack demand is an ever-present risk to which labor scheduling may be more or less responsive. When demand is slack, will hourly workers report to work as scheduled? Or will their manager cancel scheduled shifts? One arrangement has the employer bear the risk of an operating loss; the other transfers risk onto workers in the form of lost wages.

Another example shows that risk governance need not be a zero-sum proposition. If an unexpected surge in customer demand cannot be met with staff on hand, then calling in more labor can produce a greater surplus. In this scenario, decisions about whether and how to vary labor input may also affect the realization and allocation of potential gains among the workers and employer. Will workers receive their regular wage for extra hours of work? Will they share in the surplus with a premium rate or bonus? Or will potential gains fail to materialize, perhaps because the people able to adjust the schedule don't find it worth the trouble? Whatever the outcome, schedule arrangements

18

play a role in coordinating the activities and mobilizing the resources flowing in and out of the labor process (Kossek et al. 2016).

Comparative research reveals that schedule instability takes various forms depending on the institutional context, capital structure, business strategy, market conditions, and the social organization of the workplace (Bosch and Lehndorff 2005; Kalleberg 2018; Lambert et al. 2012; Rubery et al. 2005). In the fragmented and adversarial context of the contemporary US labor market, employers have wide discretion over working time and schedule arrangements, constrained mainly by competitive pressures to attract and retain qualified workers and, less commonly, by local regulations, unions, or other forms of concerted action (Alexander et al. 2015; Berg et al. 2014). The weakness of US labor standards means that employers can exercise control over the timing and duration of work without having to rely on designated "nonstandard" contracts (Vosko 2010). The US has relatively low rates of temporary and on-call employment, for example, despite widespread use of just-in-time production and contingent staffing strategies (Houseman 2001; Kalleberg 2018). To analyze schedule instability in the US context, it is necessary to examine not only the form of schedule arrangements, but also their functions for employers and consequences for workers (Fugiel and Lambert 2019).

Analyzing scheduling in terms of risk governance allows for an ecological understanding of the multiple actors, interests, and arrangements involved. Prior literature on schedule instability tends to rely on structural explanations that emphasize employers' interest in minimizing labor costs—for instance, by cutting hours in response to shortfalls in demands (Misra and Walters 2016; Schneider and Harknett 2019). However, cutting labor hours may not be necessary or even sufficient for increasing profits. On the contrary, cutting labor input may have perverse effects on operations or output that end up costing more than is saved in wages (Ton 2014). Moreover, scheduling

decisions often involve frontline managers whose interests may diverge from those of the executives or owners of the firm (Lambert and Henly 2012; McCrate 2018). Structural analysis can clarify the relative power of class actors in a given context, but it distorts our view of the heterogeneity and interdependence of risk governance in the scheduling process.

A risk governance perspective is particularly helpful in making sense of how different schedule arrangements shape the costs and benefits of exercising discretion over working time. In the US context, one of the most consequential distinctions is between hourly and salaried employment. Under the Fair Labor Standards Act (FLSA), (non-exempt) hourly workers are entitled to one and a half times their regular rate of pay for any hours in excess of forty in a single week. But there is no federal requirement for employers to offer a minimum number of hours or extra pay to offset the risk of reduced hours for workers (Alexander et al. 2015). This asymmetric constraint gives employers an incentive to set usual hours below forty if they want the option of adding hours without paying the overtime premium. It also makes it possible for employers to cut scheduled hours to avoid paying for time when labor is idle.

For salaried employees exempt from the FLSA, the situation is nearly the reverse. The employer can require them to work more hours with no additional pay, but the employer pays the same fixed cost no matter how many hours the employees are idle. This difference in risk governance leads to divergent scheduling patterns. Hourly employees are more likely to experience underemployment, such as involuntary part-time work, and cuts to their scheduled hours (Reynolds and Aletraris 2010). Salaried employees are more likely to report overwork, whether in the form of mandatory overtime or long regular hours (Golden and Gebreselassie 2007). This bifurcated pattern of hours instability has been emphasized in prior job quality and work-family literature (Jacobs and Gerson 2004; Kalleberg 2008). Yet the hourly/salaried distinction has received little theoretical

20

consideration in the sociological literature, despite its empirical importance (Pfeffer and DeVoe 2012). In this dissertation, I focus mainly on hourly employment, which is the most common arrangement across the US labor market and especially in the retail sector (Carré and Tilly 2017).

Beyond the worker-employer relationship, customers can also exercise discretion in when and how they insert themselves into the labor process, particularly in service work (Leidner 1993). The US retail sector is famously "customer friendly" in its norms of service, with workers in many establishments expected to smile, stand at the ready, and appeal in their physical appearance to customers (Misra and Walters 2016; Williams 2006). This sector also stands out with respect to long opening hours and minimal restrictions on weekend work (Carré and Tilly 2017). Although systematic data are lacking, recent studies of on-call and unstable work suggest there are relatively fewer "formal" on-call workers in the US than in other English-speaking countries, but still widespread schedule instability and unpredictability (O'Sullivan et al. 2019).

Unstable schedule arrangements are shaped by the peculiar institutional and cultural context of the US labor market and retail sector in particular. An important feature of this context is that unstable schedules rarely take the form of explicit contracts specifying nonstandard terms and conditions of work. By conventional summary measures, workers with unstable schedules may report a standard daytime shift and full-time hours in a "normal week." Only closer scrutiny reveals that these workers also experience considerable variation in the timing or hours of work over which they have little or no control. Thus, a risk-theoretic analysis must go beyond formal categories of standard and nonstandard employment in order to understand the functional differences and characteristic effects of stable and unstable schedules. To this end, I distinguish between optionality and commitment as alternative schedule arrangements with different risk-governing functions and temporal orientations.

Optionality versus commitment in scheduling

I adapt the concept of optionality from finance to conceptualize how unstable scheduling generates value for employers through a contingent and asymmetric allocation of risk and reward. An option is a derivative contract that grants one party the right but not the obligation to transact in the future on prespecified terms (Options Institute 1999). In the case of a call option, the buyer obtains the right to purchase an asset at an agreed price, typically by paying the seller a premium whether or not the option is exercised and the trade occurs. The buyer of a call option can use it speculatively to "short" the asset—for example, borrowing and selling shares of a stock with the expectation that the price will fall before the shares need to be returned. The option may also function as a kind of insurance or "hedge" against appreciation of an asset the buyer expects to purchase. Airlines routinely purchase oil "futures"—options to buy oil at a predetermined price—in order to limit their exposure to the risk of sharp price increases. But the function most relevant to unstable scheduling is purchasing a "long" call option that can yield a profit if the asset appreciates without exposing the buyer to the risk of depreciation (Meister 2021). By purchasing a call option in lieu of the actual asset, the buyer limits downside risk to the cost of the premium, but can exercise the option to realize upside potential without limit (Desai 2017).

In an analogous manner, an employer can use contingent scheduling to limit exposure to operating losses while retaining the ability to realize potential gains from labor input (Breen 1997). Like the buyer of a call option, the employer has the right but not the obligation to transact for available labor on prespecified terms, typically an hourly wage. The employer has discretion over whether or not to exercise this option according to the payoff expected on the basis of past performance and present conditions. If the marginal product of labor decreases due to slack demand, the employer can call off scheduled workers or, equivalently, discharge those already at

22

work. If the marginal product increases or holds at a profitable level relative to costs, the employer can exercise the option to increase labor input or extend the working day.

Figure 1. Schematic illustration of asynchrony in the labor process
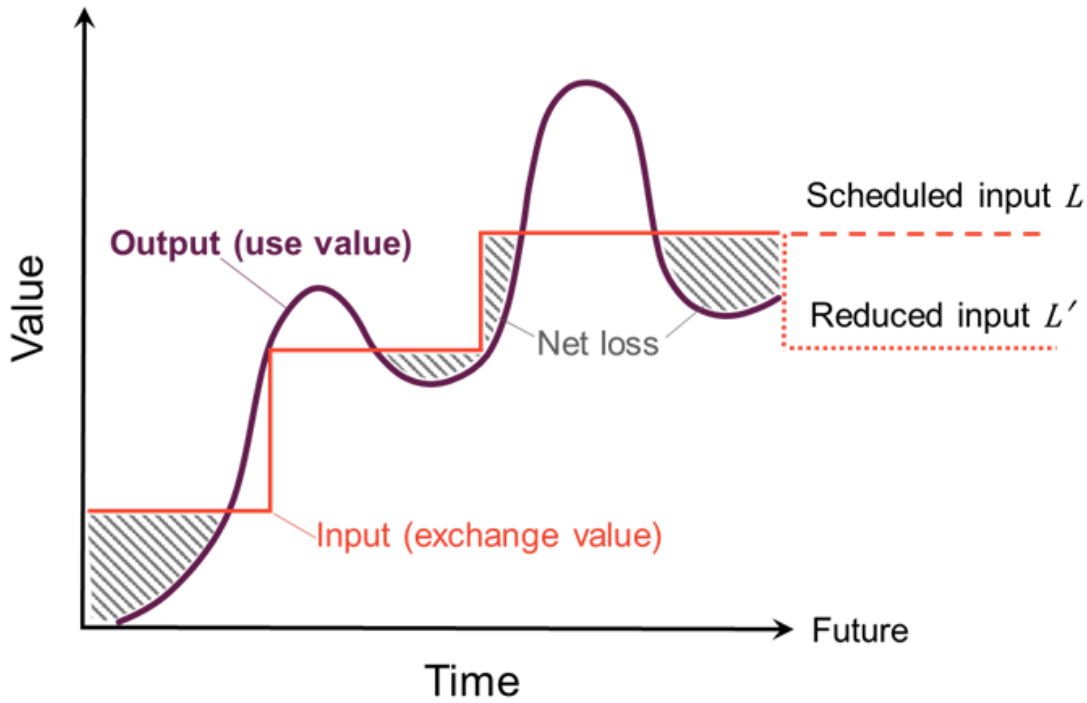
Figure 1 provides a schematic illustration of the asynchronous dynamic that makes optionality valuable as a scheduling arrangement. The figure represents the input and output of the labor process, or in Marxian terms, the exchange and use value of labor power as a pair of differently shaped lines. The output or use value of labor power is shown by the sinusoid purple line while the input or exchange value is represented by the stepwise red line. When the value of output falls below input, there is a net loss, highlighted by the shaded areas between the curves. When the value of output exceeds input, there is a surplus, corresponding to the unshaded areas between the curves. Scheduled labor input is shown as a dashed line that extends into the future.

Let us assume that losses are incurred and surplus retained wholly by the employer, who pays workers a set wage regardless of their output. If the schedule is binding on the employer, then the only way of breaking even or realizing a profit in the next period is to increase output. This is what Marx calls the production of "relative surplus value" (1990, ch. 12), which may take the form of capital investments or speeding up the pace of work. If, however, the employer has the option of changing the schedule, then this opens up another way of increasing the surplus, by reducing labor input. A reduction of labor input from the scheduled level L to the reduced level L', the dotted line in figure 1, would allow the employer to avoid further losses and instead run a surplus at the present level of output. Of course, cutting labor input may also reduce output from the labor process. The employer still bears risks with optional scheduling, but these risks can be managed over a shorter time horizon and allocated in a more asymmetric fashion than with a set schedule.

This dynamic is frequently observed in consumer services and retail sales in particular. On the one hand, customer traffic and sales vary by the time of day, day of the week, season, and other social rhythms, influencing the marginal product of labor in a retail store. On the other hand, the cost of labor is a straightforward function of the wages and number of workers "on the clock." For managers, particularly at the store level, the easiest way to minimize losses is to reduce work hours when they observe or anticipate a fall in demand (Lambert 2008). But if the manager cuts labor and demand surges higher, the store may lack sufficient staff to realize the potential surplus. The manager can call in other workers if more help is needed. Indeed, stores that maintain a large pool of part-time workers "hungry for hours" (if not formally "on-call") may find it relatively easy to replace an absent or "called off" worker on short notice (Bosch and Lehndorff 2005; McCrate et al. 2019). However, this contingent staffing strategy may not prove advantageous over the longer term if it leads to more turnover and worse performance through inconsistency and errors (Ton 2014).

I contrast optional scheduling with stable arrangements that presume greater mutual commitment in the employment relationship. While contingent schedules generate option value for employers in the short term, they may inhibit the formation and application of human capital. Recall the concept of human capital formation as an irreversible investment of labor in a specific job and setting. Optionality precludes commitment to the stable continuation of the labor process, which may undermine the quality of the work actually performed. The more the employer exercises the option to expand, contract, and rearrange the workweek, the greater the potential for disruption to workers' performance on the job and their lives outside of work. These disruptions can have immediate costs in the form of lost wages as well as longer-term ramifications for job retention and morale.

In a competitive labor market, the employer should compensate workers for the costs of instability, similar to how the buyer of a call option pays a premium to the seller. Indeed, the principle of being compensated for making oneself available to transact would seem all the more compelling for a worker, who risks being able to earn an adequate income, as compared to the seller of a call option, who risks selling assets at a loss. However, the employer may take advantage of his or her market power to offer less than the worker expects, recognizing that the worker has more limited outside options. The existence and size of compensating differentials for schedule instability is one of the empirical questions my dissertation addresses.

Whether or not workers are compensated for bearing greater risk, optional scheduling may still prove inefficient in broader welfare terms. In my framework, the key measure of welfare is labor productivity growth, since this generates surplus value that could be allocated to free up time for nonwork activities or compensate parties bearing risk in the labor process. If optional scheduling

results in a less committed workforce with lower skills and worse performance, this may lower labor productivity to such an extent that the returns to optionality are wiped out over a certain period.

The key claim for the investment side of the argument is that temporal consistency represents a form of mutual commitment between employer and worker that promotes the formation of productivity enhancing human and social capital. Workers scheduled for a more consistent set of shifts from week to week may think about and perform their job differently from workers given different shifts each week. A consistent schedule makes the job seem more sustainable, allowing the worker to see a future in it and develop skills accordingly. More consistent timing for each worker in turn contributes to better rapport and coordination between coworkers whose shifts consistently overlap. Skills and coordination take time and repetition to develop, and consistent schedules create the conditions for this development.

This line of argument leads me to the thesis that unstable scheduling brings short-term benefits at the expense of longer-term commitment and performance. Unstable scheduling is an expedient but potentially counterproductive employment practice.

Relation of the Present Study to Prior Literature

My dissertation draws on prior literature on labor market governance, precarity, and stratification in order to develop a more adequate framework for studying the scheduling process. I engage with three literatures in particular: the political economy of labor market risk, the sociology of precarious employment, and research on stratification in work-life arrangements. Each literature provides a distinctive set of concepts and explanatory claims related to the origins, functions, or effects of unstable schedules. I seek to incorporate key insights while avoiding certain limitations of prior research.

The political economy of labor market risk

The broadest literature I engage with is the political economy of labor market risk. Contributors to this literature consider labor market risk to be a central feature of modern society and a major rationale for the development of the welfare state. Some accounts of this development emphasize divergent paths of class formation and political conflict to explain the different logics and extent of risk pooling across modern welfare state regimes (Baldwin 1990; Esping-Andersen 1999). Others offer employer-centered accounts that stress differences in the demand for asset-specific investments between more or less coordinated varieties of capitalism (Hall and Soskice 2001; Iversen 2005). For my purposes, the key insight of this literature is that modern societies develop institutionally variegated but functionally similar systems of social protection and insurance against labor market risk. I build on this idea to conceptualize the risk governance functions of schedule arrangements and to contextualize the case of US retail in comparative perspective.

Political economy has traditionally focused on a rather narrow set of labor market risks, mainly unemployment, skill obsolescence, and disability due to old age or occupational injury (Clasen and Clegg 2011; Jacoby 2001; Rehm 2016). Risks that arise from the scheduling process, such as underemployment, work-life conflict, and income volatility, have received relatively little attention in this literature (O'Sullivan et al. 2019; Rubery et al. 2005). Some authors argue that "new social risks" have become more salient in developed countries as employment shifts from manufacturing to services and the "traditional" family structure of a male breadwinner and female homemaker gives way to more dual-earner and female-headed households (Esping-Andersen 1999; Vosko 2010). To the extent that this literature recognizes unstable working time as a routine risk distinct from the cyclical risk of labor market contraction, it is seen as a byproduct of "lean" production strategies that demand labor "flexibility" to adapt to volatile market conditions (Breen

27

1997; Smith 1997). Facing intensified competition due to globalization and deregulation, lean firms continually seek efficiencies through reducing labor input and adjusting it on a real-time basis to match demand (Rubery et al. 2005). However, the political economy literature provides few substantive accounts of the governance of scheduling risk, and almost none focused on the US labor market. My study thus serves as a bridge between the mostly European literature on regimes of labor market governance and the mostly American literature on scheduling risk in precarious work (Berg et al. 2014; Carré and Tilly 2017; Kalleberg 2018).

Although there is little comparative research on labor scheduling, prior literature offers a useful foundation for understanding the peculiarity of US employment relations. The US labor market is characterized by a fragmented and highly stratified system of social insurance in which employers play an unusually prominent role (Prasad 2012). Health insurance is the most notorious example of American exceptionalism in risk governance with its reliance on publicly subsidized, employer provided plans and residual public insurance only for the poor, elderly, and other high-risk groups (Quadagno 2005). More relevant for my purposes is the exceptionally low level of employment protection and collective bargaining in the US, which allows for a regime of "unilateral employer control" of many terms and conditions of employment (Berg et al. 2014). So long as employers do not engage in explicit discrimination against racial minorities, women, and other protected groups, they are free to hire and fire workers or restructure their jobs at will.[3] This

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[3] In recent years, some US states and cities have enacted labor standards that provide greater protection against arbitrary firing and scheduling abuse, particularly for vulnerable groups of workers in the retail and food service industries. I consider some of the key provisions of these new scheduling standards in chapters 2 and 3 and discuss the framing of precarious schedules as a social problem in need of a regulatory response in chapter 5.

discretion over the terms and conditions of employment is the basis for the much-discussed

flexibility of the US labor market (Esping-Andersen 1999; Kalleberg 2018).

I draw on the political economy of labor market risk not only to situate the US case in

comparative perspective, but also to critique functionalist explanations of unstable scheduling. As I

discuss below in relation to the sociology of precarious employment, claims about the greater

efficiency or profitability of unstable scheduling are common, despite little direct evidence of its

advantages over more stable arrangements at comparable firms. Comparative political economy calls

into question such claims, not about scheduling specifically, but generally with respect to the relative

performance of different employment or production strategies (Hollingsworth et al. 1994; Rubery

and Wilkinson 1994). While there may be complementarities between particular strategies, market

segments, and institutional environments, comparative scholars generally recognize that there are

trade-offs and alternatives. The success of a strategy in one institutional context may not be

replicated in another, making the attribution of success to the strategy suspect. For example,

Walmart's aggressive strategies for minimizing labor costs provided it with a competitive advantage

as it expanded into the US grocery market, but they became a liability in its abortive attempt to enter

the German market (Christopherson 2007).

The sociology of precarious employment

I engage most critically with the sociological literature on precarious work. The concept of

"precarity" originates in French scholarship on poverty and social dislocation, entering English-

language literature through comparative research and sociologists trained or influenced by Bourdieu

(Barbier 2005; Gallie and Paugam 2000; Pitrou 1978; Wacquant 1996). Over the past two decades,

US sociologists have increasingly used precarity and its cognates to comprehend unstable, insecure,

and undesirable kinds of work (Kalleberg 2009; Kalleberg and Vallas 2018; Milkman and Ott 2014;

Pugh 2017). Scheduling figures in this literature as one of many aspects of job quality that has

degraded or become more polarized relative to the postwar standard of stable, full-time employment

(Kalleberg 2018; LaBriola and Schneider 2020; McCallum 2020). The dominant explanation for this

trend is that a shift in the balance of class power following the crises of the 1970s and neoliberal

turn of the 1980s has enabled employers to impose more pliant and profitable forms of nonstandard

employment on a structurally disadvantaged and politically weakened working class (Kalleberg 2018;

Vidal 2013).

Precarious work is defined not simply by deskilling or limited mobility, but by compound

disadvantage for workers along multiple dimensions of job quality. Kalleberg's oft-cited definition of

precarious work as "uncertain, unpredictable, and risky from the point of view of the worker" (2009,

2) captures the multidimensional and negative valence of this concept. An earlier definition of

precarious work by Rodgers and Rodgers highlights the element of "insecurity and social or

economic vulnerability" (1989, 3), which proves crucial in operationalizing structural concepts of

precarious work for empirical research. While contributors to this literature note parallels in the way

that employers have externalized risks associated with different strata of the labor market, they see

precarity first and foremost as a problem for disadvantaged workers who lack effective means of

buffering or offsetting these risks (Gleeson 2016; Kalleberg 2011). Kalleberg makes this point

succinctly, stating that "[t]he extent to which work is precarious depends largely on the power of

workers" (2018, 15).

This emphasis on worker power allows for an interactive concept of precarious work as a

joint product of risky jobs and vulnerable workers, an approach that complements research on labor

market stratification along the lines of race, gender, immigration, and education (Carré and Heintz

2009; Kalleberg 2011). However, it can also lead to a functionalist view of any deviation from

standard employment as necessarily beneficial for employers and undesirable for workers. This tendency is particularly apparent in studies of precarious schedules that rely on a structural narrative of shifts in labor market power in lieu of a substantive account of how schedules become precarious for specific groups of workers or occupations (LaBriola and Schneider 2020; Schneider and Harknett 2019; Wood 2020). These studies have contributed greatly to our understanding of the magnitude of scheduling risk as well as its association with other forms of disadvantage and hardship faced by workers. But they neglect questions of when and how scheduling risk arises and arrangements for managing it change (Snyder 2016).

Structural accounts tend to assume that workers prefer full-time, long-term employment on the Fordist model of postwar manufacturing jobs (Hewison 2016; Vidal 2013). This postwar standard of good jobs remains important, not only for those workers who have held on to it, but also for those who are struggling to regain or achieve it in the face of mounting structural obstacles. But many workers—particularly in retail and other frontline service industries—neither have nor say they want this kind of job. Most part-time employment, for instance, is classified as "voluntary" because the workers do not want to work full time for "non-economic" reasons such as attending school or providing unpaid care (Tilly 1996). Available evidence suggests that unstable schedules are more likely than not to be involuntary, but still employers go to considerable lengths to recruit workers who will accept, if not prefer, such nonstandard employment (Carré and Tilly 2017; Williams and Connell 2010; Hyman 2018). Structural accounts recognize differences in workers' ability to secure standard employment, but they offer little explanation for heterogeneity in workers' job preferences or expectations.

Recent literature has shifted away from class-based, functionalist explanations toward more dynamic, institutionalist accounts of precarious work. In part, this seems to be a response to prior

critiques (Vallas and Prenner 2012), and in part, the result of cross-fertilization with international scholarship (Kalleberg and Vallas 2017). For instance, in Kalleberg's 2018 monograph, *Precarious Lives,* he expands the definition of precarious work to include "limited statutory entitlements" (2018, 15), a key feature of institutional accounts of precarity that he builds on to explain cross-national patterns in the form and extent of precarious work (Vosko 2010). Despite this institutionalist shift, structural accounts still rely on a postwar frame of reference and homogeneous class interests that limit efforts to develop more general, ecological theories of precarious work.

Structural accounts of nonstandard schedules as a tool for employers to maximize profits suffer from conceptual and empirical limitations. Conceptually, they assume an objective scale of job quality from stable to precarious with the postwar standard employment relationship as the normative reference, eliding the heterogeneous interests and expectations of labor market actors who might value the same scheduling arrangement differently (Cansoy et al. 2020; Synder 2016). Empirically, they offer a one-sided account of intensifying capitalist exploitation, neglecting changes in the labor force, product markets, and technology that shape labor scheduling in ways employers may struggle to manage, let alone optimize (Abernathy et al. 1999; Ton 2014). My dissertation represents a critical intervention in this literature by examining the historical, institutional, and organizational conditions under which nonstandard or unstable scheduling may be more or less economically efficient. This ecological approach allows for a reconceptualization of precarity as instability that frustrates the expectations and eludes the control of workers.

The stratification of work-life arrangements

The third literature my dissertation engages with is research on stratification in scheduling arrangements and work-life outcomes. Contributors to this literature have applied a variety of disciplinary perspectives and research methodologies to studying inequality in work-life spillover,

specifically through scheduling arrangements and dynamics (Jacobs and Gerson 2004; Gerstel and Clawson 2018). Unstable, unpredictable, and nonstandard schedules have been found to cause or correlate with work-life conflict, financial insecurity, psychological distress, poor sleep quality, child behavioral problems, and marital dissolution (Davis et al. 2008; Henly and Lambert 2014; Lambert, Henly, and Kim 2019; LaBriola and Schneider 2020; Leibbrand 2018; Schneider and Harknett 2019). These findings figure prominently in discussions of scheduling as a social problem (Boushey 2016; Figart 2017).

Work-life conflict and related outcomes are understood to result from an interactive process whereby focal actors—often working parents and their partners—marshal available time, money, and other resources to meet expectations at work and at home. Following the foundational work of Kahn and other work and family scholars, research in this tradition treats work-life spillover, conflict, and integration as important indicators of job quality and predictors of well-being (Greenhaus and Beutell 1985; Lambert 1990; Williams et al. 2016). Work-life scholars distinguish between multiple sources and directions of work-life interaction in an attempt to clarify the ambiguous relationship between instability and flexibility in the scheduling process. Theoretically, the key difference is whether or not the worker controls his or her working time (Kelly and Moen 2007; Lambert and Haley-Lock 2004; Lyness et al. 2012; Gerstel and Clawson 2018). If so, then variation may be interpreted as desirable flexibility. If not, then variation represents unwanted instability.

Interactive accounts explain differences in unpredictable work as part of the organizational reproduction of inequality. While many authors in this literature recognize a general trend toward job insecurity, they emphasize the specific practices that privilege White male workers while exacerbating unpredictability for women and workers of color. In a study of geoscientists in the oil

and gas industry, Williams et al. (2012) found a "gendered organizational logic" of teamwork, individualized career maps, and informal networking that limited women's opportunities for professional recognition and advancement. At the other end of the labor market, Jacobs and Padavic (2015) described how managers of low-wage occupations generate unpredictability and insecurity for their disproportionately female workforce through staffing and scheduling practices. Managers and supervisors play a crucial role in these accounts, translating organizational imperatives into concrete practices that subject disadvantaged groups of workers to greater unpredictability (Lambert and Haley-Lock 2004; Lambert and Henly 2012).

Other scholars use an interactive approach to study the family side of work-family conflict, focusing on processes of negotiation and the division of household labor. This literature again shows persistent gender inequality in family roles that expose women—and especially mothers—to more acute forms of unpredictability. Women are not only more likely to assume the role of primary caregiver to children or elderly relatives, but they are also more likely to have their work time and careers interrupted by these caregiving responsibilities. Mothers are expected to be "on call" to deal with sick children and other forms of "routine unpredictability" that conflict with work obligations and may have negative consequences for job performance and career advancement (Bianchi and Milkie 2010; Clawson and Gerstel 2014; Daly 2002).

Work-life scholars offer greater insight into the heterogeneity of what workers are looking for in a job and how they combine paid work with nonwork roles and responsibilities. Rather than deviation from the postwar standard of stable employment, this literature assesses job quality in relative terms such as fit, balance, or sustainability (Moen 2011; Voydanoff 2005). It recognizes that heterogeneity in workers' expectations is socially constructed and does not merely reflect their relative bargaining power vis-à-vis employers. I seek to build on these insights by reconceptualizing

precarity in terms of frustrated expectations and examining demographic and cultural aspects of the rise of precarious schedules.

My dissertation also contributes to the evidence base for scheduling stratification research. Most of the literature on unstable or unpredictable schedules in the US relies either on imprecise measures available in national surveys or more detailed but nonrepresentative organizational or qualitative studies. Conventional measures of work schedules, such as those that appear in supplements to the Current Population Survey, require respondents to classify their schedules according to ambiguous or arbitrary criteria (Fugiel and Lambert 2019). More precise measures that distinguish among multiple dimensions and functions of scheduling variation have only recently been included in national surveys. I take advantage of exceptionally detailed survey and administrative data on scheduling to more precisely define unstable schedules and identify their effects on the well-being and performance of workers.

Outline of Subsequent Chapters

I analyze data from multiple sources using various methodologies in order to provide a fuller picture of the origins, functions, and effects of precarious work schedules. The body of my dissertation comprises three studies: one strictly quantitative, one primarily qualitative, and one mixed-methods study. My quantitative analyses leverage longitudinal or experimental data to identify hypothesized causal effects of work schedules. In the first instance, this analysis covers a broad range of occupations and industries but centers on a few labor market outcomes. In the mixed-methods study, the analysis focuses on a small sample of stores selected from a single firm, but considers a richer array of intermediate outcomes related to scheduling consistency. The qualitative study synthesizes an eclectic collection of survey and textual evidence to explain the emergence and

spread of precarious scheduling in the US retail sector. These studies are organized in a progression from broader to more specific cases of risk governance in the scheduling process.

Chapter 2 analyzes how unstable schedules function as an implicit option on workers' time. I elaborate a risk-theoretic model in which optional scheduling allows employers to realize potential gains while limiting anticipated losses from transacting for available labor. I emphasize the contingent and asymmetric character of this arrangement, which differs from the secular process of externalizing risks described by prior studies of precarious schedules. I ask whether and how workers are compensated for the risks of schedule variation over which they have little or no control. Drawing on classic labor market theories of efficient contracts and contested exchange, I formulate a series of hypotheses concerning the conditions for and form of premium compensation, whether monetary or nonmonetary. Of particular policy relevance is the proposition (often asserted by employers and opponents of scheduling regulation) that workers with unstable schedules benefit from greater flexibility than they would from stable arrangements.

I evaluate these hypotheses using quantitative data from the National Longitudinal Survey of Youth 1997 Cohort. These data include exceptionally detailed measures of schedule control, hours volatility, and advance notice as well as an array of compensation measures and other labor market characteristics. I use these detailed measures to construct a typology of schedule arrangements, distinguishing between stable, unstable, and flexible arrangements with respect to the locus and degree of scheduling risk. The availability of four rounds of panel data over the period 2011–2017 allows me to conduct what to my knowledge is the first longitudinal analysis of the effects of scheduling risk on job benefits and pay. I use two-way fixed-effects regression to estimate marginal differences within employees between jobs with stable schedules versus unstable, unpredictable, or erratic schedules. My results challenge the predictions of classic labor market theories and suggest

36

that under some conditions, schedule instability and pay penalties may stem from inefficiencies in firm operations.

Chapter 3 surveys the intertwined history of the labor force and scheduling practices in the US retail sector. I ask why and how working time became more precarious for workers in retail sales over the course of the past century. Drawing on primary documents, historical statistics, and secondary scholarship and commentary, I trace the cultural, economic, and political currents that supplanted the long yet regular work hours typical of retail clerks in the early twentieth century with the short and unstable hours common among retail salespeople and cashiers in recent decades. My account explains precarious scheduling—temporal instability that frustrates the expectations and eludes the control of workers—as the result of a confluence of discount retailing, just-in-time logistics, and casualization and diversification of the retail labor force. The degradation of retail work has more to do with the rise of self-service and the fragmentation of working time into smaller and more generic units than it does with the "fissuring" of labor relations observed in other sectors. This refined historical narrative provides important context for the organizational study and the practical implications discussed in the final chapters of my dissertation.

Chapter 4 examines the scheduling process and operations of twenty-eight Gap clothing stores that participated in the Stable Scheduling Study in 2015–16. This study offers a rich combination of high-frequency administrative data on scheduled and actual shifts, store-level payroll and sales, employee surveys with open-ended comments, and in-depth manager interviews. The study centers on a multi-component, cluster-randomized scheduling treatment designed to improve the consistency, adequacy, and input into schedules for hourly workers. I use qualitative and quantitative techniques to evaluate the implementation and effects of the treatment, focusing on the relationship between schedule consistency and labor productivity. I construct quarterly indices of

consistency and synchronicity to measure the similarity of workweeks for individual workers over time as well as between workers in the same store. This analysis allows for a direct test of my thesis regarding the potential for productivity gains to more stable scheduling through the formation of human and social capital. My quantitative results provide little evidence of hypothesized treatment effects, which my qualitative results suggest may be due to persistent instability in the operations and governance of treatment stores.

Chapter 5 concludes with a broader discussion of scheduling as a social problem and the implications of my research for scheduling regulation. I consider the different ways that scheduling problems have been framed in recent scholarship and public discussions—as a violation of workers' autonomy, as a form of inequality that exacerbates existing gender and racial disparities, and as an exploitative business practice that gives employers short-term benefits by externalizing the costs of instability. While my risk-theoretic analysis is most aligned with the social welfare or externalities framing, I discuss how my framework can also contribute to understanding the heterogeneous effects of schedule instability on worker autonomy and inequality. More concretely, I lay out the implications of my research and unresolved issues for scheduling regulation that aims to remedy these problems. The main takeaway is that compensation penalties compound the problem of schedule instability. Contrary to the claims of opponents of scheduling regulation, workers report less beneficial flexibility in jobs with unstable schedules than comparable jobs with stable schedules. I recommend a dual approach to strengthening future scheduling proposals by requiring employers to guarantee a minimum number of hours or minimum level of earnings for each week in which workers are available to work a certain number of shifts.

Throughout this work, I emphasize the trade-off or tension between optionality and commitment as part of a broader argument against a one-sided evaluation of economic

arrangements. I frame my study as a critique of optionality and revaluation of certain forms of stability as a corrective to the contemporary preoccupation with flexibility. My goal is not to offer an apology for commitment or nostalgia for a bygone era where stability was secured through conformity and exclusion. Instead, the normative orientation of this work is pluralist, recognizing individual autonomy, social equity, and collective welfare as distinct but not exclusive values that can inform our thinking about the scheduling of work as both a problem and a resource for human flourishing.

Chapter 2. Work as an Option: Effects of Unpredictable and Unstable Schedules on Benefits and Pay

Prior research shows that unpredictable and unstable work schedules are associated with negative health, family, and economic outcomes. But evidence about the causal effects of these schedules in the United States has been limited to specific industries or organizations. I use data from the National Longitudinal Survey of Youth 1997 Cohort to analyze the effects of schedule arrangements on the job benefits and pay of workers in their twenties and thirties during the period 2011–18. This longitudinal analysis provides a rigorous test of the proposition that employers compensate employees for schedule instability, as predicted by theories of efficient labor contracts and asserted by opponents of scheduling regulation. I develop a risk-theoretic model of unstable schedules as an implicit option offering employers the right but not the obligation to vary the timing and hours of work to realize potential gains while limiting their losses. I find that workers are not compensated for optional arrangements in the form of higher pay, greater job security, or beneficial flexibility. Compared with a stable arrangements, workers with unpredictable schedules have lower job satisfaction and a substantially lower probability (-18 to -8 percentage points) of reporting a flexible work schedule as a benefit of their job. Contrary to expectations, I find that penalties for scheduling risk are not mitigated by union coverage or exacerbated by local unemployment. These results strengthen the case for scheduling regulation and show the need for alternatives to classic efficiency- and power-based theories of the market for working time.

Introduction

Time is a doubly precious resource. It can be spent producing goods and services for the market, or enjoyed at rest, recreation, or other intrinsically rewarding activities. In the classic economic model, workers choose their hours of labor and leisure to maximize utility at a given wage (Altonji and Paxson 1988; Borjas 2013). But the boundary between working time and time off of work is more fraught than this model recognizes. An employer may demand that employees be available for more time than they are actually called to work. An employer may also change the timing or number of hours that employees are scheduled to work with little warning or recourse (Lambert 2008). Though rarely specified in employment contracts, such unpredictable and unstable work schedules function as an *option* on workers' time, giving employers the right but not the obligation to expand, contract, or rearrange the workweek (Breen 1997). In an efficient labor market, employers should pay a premium for this option, compensating workers for the costs of making themselves available to work (Rosen 1986). Is this the case in the United States? Are workers rewarded for allowing their employer discretion over when and how long they work?

Despite growing interest in scheduling among sociologists and other social scientists, the answer to this question remains elusive. Most existing research on work schedules is cross-sectional. It shows that schedule instability is higher among disadvantaged groups of workers—especially those in retail or food service jobs, those without a college education, and Black or Hispanic workers—who also tend to earn less and enjoy fewer benefits than more advantaged workers (McCrate 2012; Schneider and Harknett 2019; Storer et al. 2020). But the sorting of different workers into dissimilar jobs complicates analysis of the effects of scheduling. Cross-sectional studies typically cannot distinguish the effects of job arrangements from the attributes of their incumbents, unless an arrangement has been randomly assigned (Hong 2015). Do unstable schedules exacerbate

the labor market outcomes of already disadvantaged workers? Or would these workers be worse off if they did not offer their employer the option of unstable scheduling?

These questions have both theoretical and practical importance. If workers are not compensated for the risk of variable working time, this would challenge the predictions of efficient contract theory with respect to a core component of employment. If a competitive equilibrium does not obtain for day-to-day transactions of labor time for pay and benefits, this would undermine the foundations for competitive models of the broader labor market. It would seem instead to implicate nonequilibrium theories of contested exchange or institutionalism in employment relations (Bowles and Gintis 1993; Krippner 2001; Rosenfeld 2021).

More practically, the absence of a premium for optional scheduling would strengthen the rationale for "fair workweek" laws, which have been proposed or enacted in a growing number of US jurisdictions (NWLC 2019). If workers are not rewarded for bearing scheduling risk, then they have nothing to lose from regulations that mandate greater advance notice or pay for schedule changes. Employer associations and other opponents of these regulations often claim that workers enjoy greater flexibility and earning potential in jobs with variable schedules (American Consumer Institute 2019; French 2016). Yet these claims have not been rigorously assessed in the US context.

I address this issue using previously unanalyzed data from recent rounds of the National Longitudinal Survey of Youth 1997 Cohort (NLSY97). I seek to identify what, if any, compensation workers receive for allowing their employer the option of unstable scheduling. Drawing on theories of implicit contracts, compensating differentials, and contested exchange, I formulate a series of hypotheses concerning whether and how employers might reward workers for the risk of schedule instability—with higher pay, greater job security, or schedule flexibility that benefits the worker. While prior studies have found little evidence of a wage premium for irregular shifts or unstable

hours (McCrate 2005; McCrate et al. 2019), my study represents the first longitudinal analysis of the effects of unpredictable and unstable schedules with a sample of employees spanning all major industries of the US labor market. This analysis exploits the exceptionally detailed and repeated observations of the NLSY97 to identify marginal effects of different schedule arrangements on monetary and nonmonetary compensation.

In addition to new empirical findings, I offer a novel conceptual framework and typology of schedule arrangements that distinguish multiple dimensions and combinations of temporal variation. I adapt the notion of optionality from finance in order to improve upon the more generic concept of "risk shifting" that is applied to many aspects of precarious employment under neoliberal capitalism, from individual retirement accounts to just-in-time scheduling (Hacker 2006; Kalleberg 2018; Lambert 2008). I argue for greater specificity in theorizing optional scheduling as a contingent and asymmetric arrangement for governing risk. Like the buyer of a call option, an employer can use unstable scheduling to avoid anticipated losses while retaining the ability to realize potential gains from transacting for available labor. However, optionality may come at the expense of workers' commitment to their job, especially if they are not compensated for maintaining their availability to work on demand. My risk-theoretic framework clarifies the functions of unstable scheduling and connects it to a broader trade-off between optionality and commitment in employment relations.

Benefits and Costs of Schedule Variation

Much of the literature on variable schedules focuses on beneficial accommodations for personal and family obligations outside of work (Gerstel and Clawson 2018; Perry-Jenkins and Gerstel 2020). Such "family-friendly" or "flexible" arrangements may involve changing the timing or hours of work, but to the extent that the accommodations are effective, workers exercise control over their schedule (Hill et al. 2008; Lyness et al. 2012). Worker control distinguishes flexible

arrangements from unstable schedules with variation outside of the worker's control (Lambert and Haley-Lock 2004; Lambert and Henly 2014; McCrate et al. 2019). From the worker's perspective, schedule *flexibility* represents a fringe benefit that can reduce work-life conflict and enhance job quality, whereas schedule *instability* reflects employer discretion over working time that can be disruptive or costly for the worker (Deitch and Huffman 2001; Jang, Zippay, and Park 2012; Lambert and Haley-Lock 2004).

A growing body of research examines the costs of schedule instability not only for workers themselves but also for their families and others tied to them in the "web of time" (Gerstel and Clawson 2018; Lefrançois et al. 2017). Organizational studies document the pervasive nature of schedule changes in sectors such as retail sales, food service, and health care, where fluctuations in customer demand are matched or surpassed by variation in working time (Clawson and Gerstel 2014; Halpin 2015; Henly and Lambert 2014). Without the benefit of advance notice or control of frequent schedule changes, workers are more likely to experience this variation as instability and to report health, relationship, or financial difficulties. Surveys of hourly service workers find that schedule instability correlates with economic insecurity and work-life conflict, which in turn predicts poor sleep, psychological distress, and child behavioral problems (Ananat and Gassman-Pines 2021b; Schneider and Harknett 2019). Qualitative interviews recount the havoc that erratic scheduling wreaks in the lives of poor and working-class families, not only through unreliable earnings, but also wasted time, transportation costs, patchwork childcare arrangements, and loss of government or employer benefits tied to work hours (Alvarez et al. 2020; Jacobs and Padavic 2015; Lambert and Henly 2013; Morduch and Schneider 2017).

National data on schedules remain limited, but available evidence seems consistent with the pattern of negative associations seen in firm- and industry-specific studies. Most labor force surveys

rely on a summary measure of standard/nonstandard schedules that contrasts regular daytime hours with everything else (Kleiner and Pavalko 2010; Presser 2003). By this measure, nonstandard schedules are associated with work-family conflict, marital instability, and child emotional and behavioral difficulties (Han and Fox 2011; Hendrix and Parcel 2014; Kalil, Ziol-Guest, and Epstein 2010; Strazdins et al. 2006). However, leading scholars emphasize unsociable timing (e.g., evening or night shifts) or schedule misfit (e.g., between parental work and nonparental childcare) rather than instability as the explanatory factor (Presser 2003; Voydanoff 2005).

In the few studies that distinguish between nonstandard timing and other schedule characteristics, worker control is the most consistent predictor of health and family outcomes. Analyses of the National Survey of the Changing Workforce (NSCW) link a lack of control to work-family conflict, stress, burnout, dissatisfaction, poor general health, and symptoms such as headaches, upset stomach, and insomnia (Fenwick and Tausig 2001; Jang et al. 2012). In an analysis of the National Longitudinal Survey of Youth 1979 Cohort (NLSY79) and Child Supplement, Leibbrand (2018) finds that parents working rotating and split shifts report more child behavioral problems, whereas the association is reversed or insignificant for evening and night shifts. Contrasting her study with earlier research emphasizing nonstandard timing, Leibbrand argues that "it is … instability and unpredictability that creates problems for parents and children" (2018, 2353). Using more detailed and recent data—albeit with a smaller sample—from the General Social Survey (GSS), Lambert, Henly, and Kim (2019) analyze the correlates of schedule instability, defined as volatility with little worker control over the number of hours, and unpredictability, defined as short notice or irregular timing with little control. They find positive associations between instability and job insecurity and between unpredictability and financial insecurity (Lambert et al. 2019a).

Across these various studies, a common theme is clear: workers with unstable schedules are worse off than those with more stable arrangements. But do the workers actually exposed to instability fare worse than *these same workers* would without unstable scheduling? This counterfactual question is addressed only in a handful of published studies.

Perhaps the most compelling causal evidence of the costs of schedule instability comes from field experiments designed to increase employee control or stability of scheduling within establishments or work groups (Williams et al. 2018; Kelly and Moen 2020). Given random assignment of comparable groups to control and treatment conditions, treatment-induced benefits imply equivalent costs to the scheduling practices of the control group. In a series of experiments, researchers with the Work, Family & Health Network find positive treatment effects on job retention, sleep, and physiological stress response among corporate managers, IT professionals, and at least some subgroups of long-term care workers (see Kelly and Moen 2020 for a review). In line with earlier observational research, these experiments identify employee control and reduced work-to-family conflict as key mediators.

In a separate experiment, a research team led by Williams, Lambert, and Kesavan evaluated a multi-component Stable Scheduling Treatment implemented in Gap clothing stores. A difference-in-difference analysis of pre- and post-test surveys shows an improvement in sleep quality for treatment store employees during the intervention period (Williams et al. 2019). A two-way fixed-effects analysis of store administrative data finds positive treatment effects on weekly sales and labor productivity (Williams et al. 2018). In chapter 4 of this dissertation, I conduct a mediation analysis of productivity effects of the Stable Scheduling Treatment via stability in weekly hours, consistency in timing, and synchronicity of coworking sequences at the store-quarter level.

In a different vein of research, Mas and Pallais (2017) use a discrete choice experiment to estimate the monetary value of schedule stability and control for workers. Presenting call center applicants with a choice between randomized combinations of wages and nonwage amenities, the authors analyze workers' "willingness to pay," i.e., accept lower wages, for standard or flexible schedules. They find a strong aversion to employer discretion over scheduling, particularly when this involves the possibility of working evenings or weekends. Job seekers are willing to pay on average 20 percent of wages to secure a standard workweek. More surprisingly, most workers place little monetary value on the ability to make their own schedule or choose the number of hours they work, although a sizable minority (at least 25 percent) are willing to accept 11 percent lower wages for such flexibility. The authors supplement their experimental evidence with national data from the Understanding America Survey, which reveals similar patterns and heterogeneity in worker valuations of alternative schedule arrangements.

Compensating Workers for Schedule Instability

If schedule instability is costly, why does it persist in many jobs? What, if anything, do workers gain from jobs with unpredictable and unstable schedules? There is near consensus among scholars and practitioners that unstable scheduling benefits firms serving unpredictable consumers (American Consumer Institute 2019; Clawson and Gerstel 2014; Houseman 2001; McCrate et al. 2019; Rubery et al. 2005). But scholars disagree over whether or how *workers* benefit from these arrangements. I distinguish two main approaches in the literature that invoke opposing theories of the labor market. The first draws on theories of efficient contracts to argue that workers receive premium compensation to offset the costs of instability (Hamermesh 2019; Rosen 1994). The second draws on theories of contested exchange or labor market dualism to argue that employers impose uncompensated risk on workers unable to access or negotiate better jobs (Bowles and Gintis

1993; Kalleberg 2018). Prior studies provide some evidence of compensation penalties consistent with imperfect competition for unstable hours of work (Finnigan 2018; LaBriola and Schneider 2020; McCrate et al. 2019). However, I contend that more precise concepts and measures are needed to identify the effects of schedule instability and adjudicate between alternative theories of labor compensation.

In this section, I build on the risk-theoretic framework introduced in the previous chapter to formalize and refine ideas about the implicit functions and expected effects of unstable scheduling. I begin with the premise that workers and employers are exposed to routine risks in the labor process, which may be anticipated, allocated, and insured against through different types of schedule arrangements (Bosch and Lehndorff 2005; Lambert 2008). Both efficiency- and power-based theories recognize risk-governing functions of different employment arrangements. Yet the specific functions of unstable schedules have not been adequately theorized in more generic accounts of risk shifting. I adapt the notion of optionality from finance to conceptualize how unstable schedules function as a contingent labor contract with an asymmetric allocation of potential gains and losses (Breen 1997). I then formulate hypotheses concerning differential compensation for optional scheduling arrangements, drawing on theories of efficient contracts and contested exchange.

Risk governance in the scheduling process

In the previous chapter, I introduced the concept of risk governance to refer to the social process of making provisions for detrimental or beneficial consequences of hypothetical occurrences. I conceive of governance broadly, encompassing both public and private, formal and informal arrangements. In the political economy literature I draw on, the governance of labor market risk is understood as a core function of the modern welfare state. This risk-theoretic approach uses concepts such as risk sharing or pooling and contributory or subsidized benefits to

analyze publicly administered or regulated schemes of social provisioning and insurance (Baldwin 1990; Clasen and Clegg 2011; Rehm 2016). The analysis can be applied not only to programs such as Social Security or unemployment insurance, where the insurance functions are obvious, but also education and job training programs, where these functions are implicit (Esping-Andersen 1999; Iversen 2005). A commonality of these classic forms of social insurance is that they are concerned with what I call *episodic* risk—extraordinary changes in workers' labor market status or capabilities. Episodic risks are typically discrete, have a low incidence rate, and are thus amenable to governance arrangements predicated on well-defined parties and conditions of application. Under these arrangements, workers have specific rights and obligations according to their status (in employment, retirement, on leave, etc.) and history (of work, contributions, benefits, etc.).

I extend this analysis to schedule arrangements, which perform risk governance functions of a different kind. Risks in the scheduling process include transitory and periodic occurrences such as fluctuations in supply or demand, inclement weather, conflicting work demands or nonwork engagements. Rather than a discrete change in status, these risks typically manifest as an operational disruption or breakdown in coordination (Snyder 2016; Ton 2014). Scheduling risks can thus propagate to subsequent activities and other actors connected in the "web of time" (Clawson and Gerstel 2014). While any one instance may carry only minor costs or benefits, the cumulative effects may become substantial through widespread or repeated exposure. Work schedules represent more or less routine arrangements for anticipating and allocating risks that may arise and propagate through the labor process.

In this chapter, I focus on implicit forms of risk governance in the employer-employee relationship. I propose a model of work as an option to clarify the risk-governing functions of unstable scheduling and analyze their relation to various forms of compensation. I discuss the

implications of this analysis for scheduling policy, but I reserve a fuller discussion of public governance of scheduling risk for later chapters.

In my model of schedule arrangements, the central axis is control, both in the sense of decision-making power and discretion over scheduling. Control can be exercised over multiple dimensions of working time with varying frequency to manage risk. Employers may extend or cut work hours to match the ebb and flow of customers or other inputs to the labor process. They may schedule workers for different times and days from week to week to ensure coverage of critical tasks. And they may post or update schedules with little lead time in order to incorporate more timely information in their plans. Such exercises of employer discretion can mitigate disruptions to business operations, but they generate schedule instability for workers. In this way, schedule control enables the employer to "transfer" risk onto workers who are willing and able to work unstable schedules (Lambert 2008).

Workers may also exercise control or at least request accommodations in the scheduling process. They may designate certain days or times when they are not available to work. They may arrange for a coworker to cover or swap shifts (Henly et al. 2006; Root and Young 2011). They may even have discretion over when they start and end work each day, or be able to "flex" extra hours of work by reducing hours on another day (Hill et al. 2008). But employees rarely exercise schedule control without prior authorization or approval by their employer or supervisor. Even in jobs with formal leave or "flextime" policies, managers can set limits on their use—for instance "blocking out" certain times or denying requests that could disrupt an important work process (Perlow 2012).

Thus, what matters for risk governance is the *exercise* of control in the scheduling process. This is why I focus on the functions and effects of schedule arrangements rather than their formal rights or designation. An employer can get employees to work on demand or call off scheduled

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shifts without having to designate them as "on-call" workers or shifts. The variance between the form and function of schedule arrangements is particularly important in the US context, where working time arrangements are weakly institutionalized and the protections accorded to standard employment "degraded" in comparison with other wealthy countries (Berg et al. 2014; O'Sullivan et al. 2019; Vosko 2010).

Beyond the locus of control, schedule arrangements differ in the extent of variation. I treat the extent of variation as a measure of the magnitude of risk in schedule arrangements. This relationship is most direct with respect to variation in the number of hours. Since the earnings of hourly workers are proportional to their hours of work, more volatile hours expose workers to greater risk that their income will exceed or fall below an expected level. Such volatility can lead workers to fall behind or default on expenses or lose access to hours- or income-rated benefits (Lambert and Henly 2013; Morduch and Schneider 2017). The magnitude of scheduling risk also depends on the length of advance notice that employers or workers give for scheduling decisions. An employer who posts the work schedule mere days before the start of the workweek exposes workers to greater risk of work-life conflict, which in turn may increase the risk of absenteeism (Henly and Lambert 2014).

This understanding of schedules as risk governance arrangements provides the general framework for a more specific model of unstable schedules as an implicit option on the worker's time.

Optionality versus commitment in scheduling arrangements

An option is a type of derivative contract in which one party obtains the right but not the obligation to transact in the future on prespecified terms (Options Institute 1999). Options contracts vary with respect to the asset being traded, the terms of the trade, and which party has discretion

over when or whether to carry out the trade. The most relevant arrangement for my purposes is a *call option*, which specifies the price for an asset that the buyer may decline or defer to purchase until a future date. A call option exposes the seller to the risk that the market value of their asset will exceed the price specified in the contract, resulting in a loss. As compensation for this risk, the seller demands a premium that the buyer must pay whether or not the option is exercised—that is, regardless of whether the trade is carried out. The buyer of a call option limits their potential losses (to the cost of the premium) but can in principle realize unlimited gains by purchasing the asset for less than its future market value. In this way, a call option functions as a kind of insurance. But unlike accident or life insurance, the buyer enjoys greater upside potential than the seller (Breen 1997).

Under standard economic assumptions, the premium for an option should reflect the riskiness of the underlying asset (Dixit and Pindyck 1994; Meister 2021). All else being equal, the more volatile the price of an asset, the higher the premium a seller can demand for a call option. The premium should also increase with the length of maturity—how far in the future the option can be exercised—since risk is a function not only of the magnitude of price deviations but also the length of exposure. Pricing options is a complex matter (Black and Scholes 1973), but for my purposes it is sufficient to assume that buyers will not (repeatedly) purchase the option, or will be indifferent to exercising it unless they believe the value to be positive. This belief may be mistaken, as I will suggest is the case for some schedule arrangements. Still, loss averse employers may forgo some potential gains in order to contain downside risk (Kahneman 2011).

I adapt this notion of optionality to clarify the risk-governing functions of unstable scheduling and the inherent trade-off between optionality and commitment in employment relations (Breen 1997; Desai 2017). I present a model of "work as an option" in the spirit of *real options theory*,

which analyzes nonfinancial assets by analogy with financial options (Meister 2021; Trigeorgis and Reuer 2017). In this case, the underlying "asset" is the time and effort of the worker, or "labor power," to use Marx's term. Like a call option, an unstable schedule gives the employer the right but not the obligation to transact for hours of labor in whatever quantity employees make available, typically at a predetermined wage or salary. Through this arrangement, the employer can limit losses due to slack demand while retaining the ability to realize potential gains from employing available labor.

In risk-theoretic terms, *optionality* implies an asymmetric and contingent arrangement that is functionally distinct from mere externalization of risk. The employer can change the schedule to capture gains or limit losses, but workers must incur certain costs to make themselves available to work. At a minimum, work availability requires the worker to be present or responsive to the employer, which precludes many situations or activities the worker might otherwise find worthwhile. In addition to opportunity costs, workers may incur work-related childcare or transportation costs that cannot be recouped if a shift is canceled or cut short. Workers may also suffer indirect costs to their health, well-being, and family relationships as shown in prior research on unstable schedules (Gerstel and Clawson 2018). I expect the total cost of instability for the worker to be a function of the magnitude of variation and length of advance notice provided by the employer. The more volatile or unpredictable the schedule, the greater the risk to which the worker is exposed, and the higher the expected premium for this option.

The model of work as an option provides a more precise representation of the stylized facts already noted in existing literature. Employers value contingent scheduling arrangements that facilitate rapid adjustment to changing business conditions (Houseman 2001; Ikeler 2016). They can use discretion over scheduling to reduce labor input, shifting downside risk onto workers (Bosch

and Lehndorff 2005; Lambert 2008). But unlike the secular shift from employer pensions to individual retirement savings, employers can also realize potential gains by expanding or rearranging the workweek (Rubery et al. 2005; Wood 2020). Through this contingent and asymmetric allocation of risk, unstable schedules function as an option on the worker's time. The risk the worker bears with optional scheduling depends jointly on the extent of employer discretion and the magnitude of variation in the timing or hours of work (Lambert et al. 2019a; Schneider and Harknett 2019). In this way, my model offers a theoretical basis for gauging scheduling risk and for distinguishing unstable schedules from either stable or flexible arrangements.

Although my focus in this chapter is on work as an option, I situate this model in a larger framework that contrasts optionality with commitment as opposing strategies for governing risk and generating value in the capitalist production process. I challenge the assumption that unstable scheduling is necessarily more efficient in servicing variable customer demand. I recognize that productivity in services depends not only on the quantity of labor input, but also on the quality and range of services provided (Betancourt 2004; Carré and Tilly 2017). Components of service quality—such as knowledge and coordination—require time, effort, and repetition to develop and maintain. To extend the analogy with finance, we can conceive of skill formation as an investment in human and social capital, which appreciates only if sustained over a period of months or years. Unstable scheduling creates option value for employers in the short term, but it may come at the expense of mutual commitment in the employment relationship (Desai 2017). Conversely, stable schedules may result in operating losses during periods of slack demand, but these losses can be offset by increasing worker retention and improving performance (Ton 2014). This trade-off between optionality and commitment reflects the dual character of labor under capitalism as both a cost of production and a productive asset.

Main hypotheses: Compensating differentials for scheduling risk

I formalize the predictions of my model of work as an option drawing on two general theories of the labor market: compensating differentials and contested exchange. The former is a classic theory in labor economics that predicts premium compensation for workers who bear greater risk in market equilibrium. The latter is a heterodox theory that predicts systematic deviation from competitive labor compensation due to power differentials between workers and employers. I use these theories mainly to formulate hypotheses about the possible kinds and conditions of premium compensation for optional arrangements.

Compensating differentials are monetary increments that "equalize the total monetary and nonmonetary advantages or disadvantages among work activities and among workers themselves" (Rosen 1986, 641). This theory is frequently used to explain observed wage premiums—for night shifts, for instance—and more generally to understand how wage differences can persist under equilibrium conditions in labor markets with heterogeneous jobs (Hamermesh 2019; Kostiuk 1990). In most applications, the value of such differentials is analyzed in terms of job "disamenties," i.e., costs, inconveniences, and other disadvantages workers experience (Rosen 1986). In a competitive labor market, these disadvantages should be compensated by higher earnings or other advantages such that the marginal worker is indifferent to changing jobs.

While this theory rests on strong assumptions about perfect competition and efficient contracts (McCrate 2005; Rosenfeld 2021), it has the merit of producing clear hypotheses regarding compensation for scheduling risk. If some jobs entail more risk than others, then workers must receive compensating differentials to accept work as an option in lieu of a less risky alternative. The most obvious way to compensate them would be to pay a monetary premium above what they could earn in otherwise equivalent jobs with a stable schedule. This leads to my first hypothesis.

Hypothesis 1. Employees receive higher pay for unstable schedules.[4]

Compensating differentials need not take the form of an immediate pay premium. Drawing on theories of implicit labor contracts, we can extend the logic of "equalizing differences" to other forms of compensation (Rosen 1994). In the literature on social mobility, I see a useful version of this logic in models analyzing career trajectories as an implicit trade-off between job security and opportunities for advancement (Breen and Goldthorpe 1997; Halaby 2003). The key idea is that employers can entice a worker to accept less desirable starting terms if they offer some assurance of future rewards. The worker may accept schedule instability on a temporary basis as a "stepping stone" to greater compensation over time (Addison et al. 2015). Such deferred compensation may take the form of greater job security or upward mobility. My second hypothesis concerns a minimal condition for deferred compensation: retention by the same employer.

Hypothesis 2. Unstable schedules increase the probability of job retention.

Compensating differentials may also take the form of intrinsic or intangible rewards. Of particular relevance for my purposes are theories of efficient matching between jobs with heterogeneous attributes and workers with heterogeneous preferences or personal commitments— for instance, parents or students. The better the fit between worker and job, the greater the utility for the worker. The utility derived from a job that satisfies the worker's preferences can compensate for scheduling risk that would be unacceptable to other workers (Mas and Pallais 2017). This is the logic underlying the most common explanation for why workers accept unstable schedules: they

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[4] I use "unstable schedules" here as a shorthand for optional arrangements that expose workers to scheduling risk, including volatile hours and unpredictable timing. In the following section, I provide a more precise typology that distinguishes multiple dimensions and levels of scheduling risk. Yet I will still refer to "unstable scheduling" or "schedule instability" to encompass unpredictable, unstable, and erratic arrangements in contrast to stable or flexible schedules. I hope that avoiding more cumbersome lists or acronyms is sufficient justification for this double use of instability.

prefer the flexibility that comes with schedule instability (American Consumer Institute 2019; French 2016). This claim may seem paradoxical given the distinction between instability and flexibility that I adopt from studies of employer versus employee control (Lambert and Haley-Lock 2004; Lambert et al. 2014; McCrate 2012). But control is a relative concept. It is not a contradiction for workers to enjoy greater flexibility with variable than with rigid schedules, even if this variation largely reflects employer discretion (Mathur 2017). My third hypothesis directly tests for the intrinsic reward of schedule flexibility often promised by employers who demand work as an option.

Hypothesis 3. Unstable schedules increase beneficial flexibility for employees.

While beneficial flexibility figures most prominently in the public discourse around scheduling, there may be other nonmonetary rewards for unstable schedules. By the efficient matching logic, these benefits should contribute to worker utility, however intangible or idiosyncratic they may appear to an observer. Using job satisfaction as a proxy for utility, we can infer compensating differentials from *equivalent* levels of job satisfaction in different schedule arrangements. If a worker is as satisfied with an unstable schedule as with a stable one, this would imply either that the worker is indifferent to scheduling risk or else derives sufficient utility from other job attributes to compensate for this risk. My fourth hypothesis represents an omnibus test of compensating differentials for scheduling risk using self-reported job satisfaction as a proxy for worker utility.

Hypothesis 4. Employees report equivalent job satisfaction with stable and unstable schedules.

Alternate hypotheses: Contested exchange in schedule arrangements

An alternative to the efficient contract theory of compensating differentials is the theory of contested exchange developed by Bowles and Gintis (1993). The basic thesis is that prevailing terms and conditions of employment deviate systematically from competitive equilibrium due to employer

power over job seekers and employees. Many sociologists offer power-based accounts of labor market inequality (Rosenfeld 2021), but the theory of contested exchange highlights agency and enforcement issues that are especially relevant to schedule arrangements.

Employer claims on the working time of employees can only be enforced with the latter's cooperation, whether eagerly extended or grudgingly conceded. The employer may demand "open availability" for work, but the option value of unstable scheduling can be realized only to the extent that employees report to work when called and perform their duties as expected (Lambert et al. 2012; Wood 2020). The degree to which employer discretion over scheduling is enforceable or effective can be conceptualized in terms of the relative power of the employer and employee. All else being equal, conditions that strengthen the workers' bargaining position should result in more favorable terms of employment, such as greater compensation for scheduling risk. Conditions that strengthen the employer's position should lower compensation and coerce workers to accept unfavorable terms (Ikeler 2016).

I operationalize this theory using different proxies for employer versus worker power. I treat unemployment as a proxy for employer power and test for moderating relationships between the level of unemployment and differential compensation for scheduling risk. Given contested exchange, increased unemployment should attenuate the compensation premium, or equivalently, exacerbate the penalty for scheduling risk since unemployment gives employers "short-side" power to more easily replace employees (Bowles and Gintis 1993). My fifth hypothesis formulates this claim in negative terms, following prior studies (Finnigan 2018; LaBriola and Schneider 2020).

Hypothesis 5. Unemployment exacerbates compensation penalties for unstable schedules.

Finally, I formulate an alternate moderation hypothesis using union coverage as a proxy for worker power. Insofar as a union contract or collective agreement reflects greater power in numbers,

this coverage should attenuate compensation penalties for scheduling risk. Note that this moderation claim concerns the relative compensation of workers exposed to scheduling risk, not the degree of instability to which workers are exposed. My sixth hypothesis is the mirror image of the fifth, with union coverage substituting for unemployment.

Hypothesis 6. Union coverage attenuates compensation penalties for unstable schedules.

Suggestive evidence of penalties for hours instability

While mine is not the first study to consider the relationship between schedule instability and compensation, I offer a more thorough evaluation of this relationship, taking advantage of more precise measures and a longer panel than prior studies. The closest analogue to the approach of this chapter is an analysis of 2003–2004 panel data from the Canadian Workplace and Employee Survey (WES) by McCrate, Lambert, and Henly (2019). Using both a categorical and continuous measure of variability in weekly work hours, the authors find a positive cross-sectional association with underemployment, defined as a preference for more hours of work at the same hourly rate of pay. They then fit a first-difference model to identify negative effects of hour variability on the total number of hours reported by workers who were underemployed or satisfied with their hours in 2003. Although the WES does not directly measure schedule control, McCrate and her coauthors infer lack of employee control from the underemployment measure, interpreting their results as evidence of a demand-side constraint on the number of hours (2019, 1295). They find no evidence of compensating differentials with respect to hourly pay. However, this analysis does not examine nonmonetary benefits such as flexible or family-friendly timing, which may offset the costs of unstable hours (Golden 2008; McCrate 2005).

Other recent studies provide more indirect evidence of contested exchange in schedule arrangements. These studies do not differentiate instability and flexibility, but they reveal an inverse

relationship between worker power and exposure to costly forms of hours variability. Using data from the Survey of Income and Program Participation (SIPP), Finnigan (2018) found that the incidence of variable hours increased in tandem with unemployment during the Great Recession and is associated with greater income volatility. In a related paper, Finnigan and Hale (2018) showed that union members are less likely than nonunion workers to report variable hours, particularly in states with high union density. They also found that union membership attenuates the monthly earnings penalties associated with variable hours and nonstandard schedules. Their results suggest that earnings penalties are due to lower average hours as opposed to a lower hourly wage, but (unlike the WES) the SIPP only captures variability in lieu of the number of usual hours of work (Finnigan and Hale 2018, 1564n1). Using panel data from the Current Population Survey (CPS), LaBriola and Schneider (2020) found that hour volatility, defined as the coefficient of variation in actual hours of work per week, is greatest in the bottom wage quartile and that this disparity is positively related to state-level unemployment rates and negatively related to union coverage.

These studies provide little evidence of compensating differentials for scheduling risk. On the contrary, they suggest that exposure to variable hours is a function of workers' power to bargain collectively in their current job or find a better one with another employer. But without a measure of schedule control, it is not possible to distinguish flexibility from instability, let alone identify their respective effects on compensation. My study contributes more precise measures of unstable schedules as well as causal evidence of compensation penalties.

Data and Methods

I use the best available longitudinal data on schedules and compensation in the US labor market. These data come from four recent rounds (15–18) of the National Longitudinal Survey of Youth, 1997 Cohort (NLSY97). The NLSY97 is an ongoing survey sponsored by the Bureau of

Labor Statistics (BLS) and conducted by NORC using a combination of in-person and telephone interviews with limited web-based reporting (Hagerty 2015). The survey collects detailed information on the behavior, attitudes, and experiences of a cohort of 8,984 individuals born between 1980 and 1984 who were adolescents living in the United States in 1997 when they participated in the initial interview. The NLSY97 uses a stratified, area-probability sampling design with an oversample of Black and Hispanic youth (Moore et al. 2000). The public-use data include round-specific weights and information on sampling units that permit researchers to estimate characteristics of the cohort population and correct for design effects (BLS 2020a).

In 2011, the NLSY97 began asking questions about schedule control, advance notice, and variation in work hours recommended by Susan Lambert and Julia Henly (2014). Together with existing items on usual hours of work, shift timing, and job benefits, these questions make it possible to distinguish multiple dimensions of schedule variation and identify optional arrangements. The NLSY97 also offers information on respondents' personal relationships, household composition, schooling, and other characteristics relevant to labor market outcomes. While the abundance of round- and job-specific items make these data more challenging to work with than a typical cross-sectional survey, they provide an exceptionally detailed and long-running record of the careers of workers entering the labor market around the turn of the millennium.

In general, the NLSY97 adheres to the highest standards for data collection and quality assurance. It has maintained a high response rate over time, interviewing nearly 75 percent of the sample in round 18. However, the addition of new items to the already complex questionnaire can occasion errors or inconsistencies affecting data quality. This was the case with the work schedule items added in 2011. In each of the four rounds of data used in this chapter, programming errors or administrative decisions resulted in a subset of eligible respondents being skipped past some of the

61

scheduling questions. The details of these errors and characteristics of excluded respondents differ from round to round, even from the beginning to the end of the field period in a single round. The preponderance of evidence suggests that the observed sample yields conservative but qualitatively similar results to what would be obtained with an unbiased sample.[5] I discuss how data limitations qualify the conclusions I draw toward the end of the chapter.

The population of interest for this study consists of workers born between 1980 and 1984, residing in the US, and employed for at least one hour per week in a civilian "main job" (the job in which they work the most hours). This definition imposes a few additional restrictions on my analytic sample of NLSY97 respondents. I exclude workers whose main job is in the military or self-employment. I also omit employees with zero hours of paid work, whether due to an involuntary layoff or voluntary leave of absence. The resulting analytic sample comprises 15,964 observations on 5,921 unique employees interviewed between 2011 and 2018 when they were 26–38 years old. Appendix B provides summary statistics on the demographic and labor market characteristics of the cohort population represented by this sample.

Measures of schedule characteristics

I derive measures of schedule characteristics from a series of questions about advance schedule notice, employee control of timing, and the range of weekly hours worked in the past month. Appendix A provides the full text of the relevant questions and response categories in the

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[5] This claim is based on alternate analyses using multiple imputation. The number of eligible respondents missing data on one of the main scheduling items ranges from a low of 863 in round 16 to a high of 2,769 in round 18, when the primary schedule control question was dropped two months into the field period due to concerns about interview length. The group most underrepresented in my analytic sample are workers who receive overtime pay (36 percent as compared with 45 percent for the full sample), since reporting overtime pay leads to a branch of the questionnaire where most of the skip errors were located. The main analyses reported in this chapter use listwise deletion and ordinary least squares estimation, but include as a control an indicator of overtime pay.

NLSY97. Note that the questions on the number of work hours ask for "all hours," including

overtime and time working from home, but instruct respondents *not* to report weeks in which they

"missed work because of illness or vacation." I combine these items with information on

respondents' usual hours of work to calculate a relative measure of volatility using the formula

below. The thinking behind this measure is that for someone working 35 hours in a normal week, a

few hours more or less may not make much difference, but for someone only working 20 hours, an

equivalent difference in hours represents more substantial volatility.[6]

$$Volatility = \frac{most - fewest}{normal\ hours} \tag{1}$$

Table 1 summarizes the distribution of schedules along the three main dimensions of

schedule control, advance notice, and volatility in each of the four survey rounds. As a shorthand, I

refer to the rounds by the year in which data collection began. I accentuate contrasts of interest by

collapsing some response categories and dividing my continuous volatility measure into four bins. I

use round-specific weights that adjust for the initial sampling probability as well as differential non-

response to estimate the schedule characteristics of employees in the NLSY97 cohort (Moore et al.

2000). In the final row, I include the unweighted number of observations in the analytic sample,

counting all cases with valid responses on at least one of these three characteristics.

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[6] Lambert and Henly call this measure the "instability ratio" (IR) (2014, 7). It is analogous to the coefficient of variation (CV) used by LaBriola and Schneider to measure work hour volatility across four reference weeks of the CPS (2020). Whereas the IR measures the *range* of variation relative to self-reported normal hours, the CV measures the *entropy* of hours worked as the standard deviation relative to the mean for the series of observed weeks. If we substitute the observed midpoint (0.5*most + 0.5*fewest) for self-reported normal hours in the denominator of formula 1, the measure of volatility would be equivalent to 2*CV for the two reference weeks.

Table 1. Distribution of schedule characteristics by year of National Longitudinal Survey

Schedule characteristic		2011 %	2013 %	2015 %	2017 %
Control	Employee	22.7	27.9	29.5	32.7
	Employer	73.9	66.3	64.6	62
	Outside	3.5	5.8	5.9	5.2
Advance notice	1 week or less	37.3	26.6	24.6	26.5
	Between 1 and 2 weeks	11.6	9.8	10.5	10.9
	3 weeks or more	51.1	63.6	64.9	62.6
Volatility	Less than 5%	26.5	27.8	25.7	22.4
	At least 5, less than 25%	27	25.6	27.2	24.8
	At least 25, less than 50%	24.6	25.9	25.4	26.9
	50% or more	21.9	20.7	21.7	25.8
Sample N		3,542	4,049	4,129	4,244

Note: Percentages estimated using round-specific weights (SAMPLING_WEIGHT_CC). Year corresponds to the start of the field period, which typically runs from autumn through summer of the following year. Sample Ns are for the analytic sample of civilian employees with at least one observation on key schedule items.

For the first set of rows in table 1, the key contrast is between employee versus employer or outside control of scheduling. Most employees report that their starting and finishing times are decided by their employer with little or no employee input. Yet the share of employees who decide their own working hours increases from less than a quarter in 2011 to nearly a third in 2017. This increase may be a function of the age or seniority of cohort members or improving labor market conditions over the study period.

With respect to advance notice, the middle rows of table 1 suggest a bimodal distribution. Most employees say they usually know the days and hours they need to work 3 weeks or further in advance. Only one in ten employees report 1–2 weeks' notice, but at least one in four report 1 week or less advance notice, which is below the 10–14-day standard set by fair workweek laws (NWLC 2019).

To tabulate volatility, I use convenient cut points that divide the distribution into four bins each with roughly a quarter of the cohort population. I follow studies of intra-year income variation that treat 25 percent above or below normal as the threshold for "considerable" volatility (Hacker et al. 2014; Morduch and Schneider 2017). Approximately half of the employees in the NLSY97 cohort report this level or more volatility in their weekly hours of work in the past month. The incidence of considerable volatility increases somewhat over the study period, from less than 47 percent in 2011 to more than 52 percent of employees in 2017. The appearance of cross-cutting trends in control, notice, and volatility highlights the need for a multidimensional approach that distinguishes between different levels and combinations of schedule variation (Fugiel and Lambert 2019).

Typology of schedule arrangements

I classify schedule arrangements by dichotomizing each dimension of variation and combining them into an eightfold typology. My approach improves upon existing literature by more precisely distinguishing between stable, unstable, and flexible arrangements. Rather than relying on conventional summary measures of "nonstandard" or "variable" schedules, I use the model of work as an option to differentiate arrangements in terms of their risk-governing functions. I recognize that scheduling risk is a joint function of multiple dimensions of schedule variation, but I do not assume this variation has a common scale. Instead, I allow for distinct combinations of schedule control, volatility, and advance notice to have specific effects once variation exceeds a certain threshold.

The thresholds I use to categorize arrangements reflect a mix of theoretical and practical concerns. The clearest theoretical rationale is for collapsing the five categories of schedule control into a dichotomous measure based on whether the locus of control lies mostly with the worker or outside, i.e., with the employer or clients (Kelly and Moen 2007; Lambert and Henly 2014). This measure is critical to my distinction between instability as an option for the employer and flexibility

as a benefit for the worker. My choice of a week or less as the threshold for short notice is based on regulations that typically set two weeks as the standard for predictable scheduling (Figart 2017; NWLC 2019). For volatile hours, I adopt the 25 percent threshold from research on income volatility (Hacker et al. 2014), since for most employees this represents at least a day's worth of hours and, for hourly workers, earnings.

I use these three component indicators—employee control, short notice, and considerable volatility—to define eight schedule arrangements. I build on work by Susan Lambert and colleagues who define *unstable* schedules as the combination of variable hours with little or no employee control (Lambert et al. 2012; McCrate 2012). This arrangement is conceptually distinct from a *volatile* schedule over which the employee has more control. Similarly, I define *unpredictable* schedules as the combination of short notice with little or no employee control, which is distinct from a *short-term* arrangement with employee control. In my typology, the locus of schedule control changes the interpretation even of a relatively consistent schedule (i.e., one with volatility of less than 25 percent of normal hours and more than a week advance notice), which I characterize as *rigid* without employee control but *stable* with it. Finally, I characterize the combination of volatile hours and short notice with outside control as an *erratic* arrangement, which is distinct from a *flexible* arrangement with employee control.

Table 2 lists these eight schedule types with the corresponding values of the component indicators and estimates of their incidence over time. I array the rows in a symmetric fashion with the least variable schedules (stable and rigid) in the center and the most variable at either end of a spectrum—from greater flexibility for the employee to greater optionality for the employer. For example, I put erratic schedules at the bottom of the table since this arrangement implies more

optionality for the employer and greater risk for workers than unpredictable schedules without volatile hours.

A plurality of employees in this cohort (30–33 percent) have rigid schedules, defined by a lack of employee control, little volatility, but more than a week advance notice. Over the study period, we see a trend toward greater employee control and predictability with the increase of volatile and stable schedules on the one hand, and the decrease of unpredictable and erratic schedules on the other. Nevertheless, the incidence of unstable, unpredictable, and erratic schedules is much higher than standard measures of variable schedules (Fugiel and Lambert 2019; McCrate 2018). While only 2–3 percent of employees classify their schedule as "irregular" (YEMP-81300, not shown in table), between a third and half report either instability or unpredictability. Furthermore, some 1 in 10 employees have an erratic schedule with both instability and short notice—an arrangement that is largely invisible in prior quantitative studies (except for Lambert et al. 2014).

Table 2. Schedule typology and incidence by year

	Schedule type	Component indicators (Z)			2011	2013	2015	2017
		Employee control	Notice ≤ 1 week	Volatility ≥ 25%	%	%	%	%
1.	Flexible	1	1	1	4.9	4.3	4.3	4.9
2.	Short-term	1	1	0	3.4	2.6	2.1	2.2
3.	Volatile	1	0	1	6.5	9.8	11.4	12.8
4.	Stable	1	0	0	7.9	11.1	11.8	12.7
5.	Rigid	0	0	0	30.5	32.5	32.3	30.1
6.	Unstable	0	0	1	18.0	20.2	19.9	21.8
7.	Unpredictable	0	1	0	11.9	7.3	6.8	5.8
8.	Erratic	0	1	1	17.0	12.2	11.5	9.6

Note: Percentages estimated using round-specific weights.

This typology not only sheds new light on previously obscure arrangements, it also permits a more precise analysis of the effects of instability as distinct from flexibility. Conventional measures confound different sources and dimensions of schedule variation, relying on summary contrasts

such as standard versus nonstandard or regular versus irregular. Recent research from the Shift Project uses more detailed measures of typical as well as occasional scheduling practices, including short notice, lack of employee control, shift cancellations, and working "clopening" shifts with little time to rest between closing and opening a store (Schneider and Harknett 2019, 94). Schneider, Harknett, and colleagues construct an additive scale of these items which they interpret as an index of schedule instability or precarity (Schneider and Harknett 2019; Storer et al. 2020). Their approach implicitly assumes that component indicators have equivalent effects. I relax this assumption in order to identify the effects not only of quantitative differences in the *level* of scheduling risk, but also qualitative differences in the *function* of schedule arrangements, as an option for employer discretion, flexibility for the worker's benefit, or mutual commitment to maintaining stable work.

Compensation outcomes

An advantage of the NLSY97 in comparison with other national surveys is that it captures job-specific measures of scheduling and compensation. This makes it possible to analyze the effects of scheduling risk on compensation by the same employer who exercises an implicit option on the worker's time. While part-time workers with volatile hours on their main job may supplement unreliable earnings with a second job or other ways of generating income, this supplemental income does not constitute compensation for scheduling risk, but rather a coping strategy or hedge against this risk (Morduch and Schneider 2017). For this reason, I restrict my analysis to monetary and nonmonetary compensation in the *main job*, defined by the BLS as the current job in which the employee works the most hours or, in the case of a tie, the job with the longest duration.

Hourly pay

I use the measure of total hourly pay (CV_HRLY_COMPENSATION) that the BLS calculates based on respondents' usual hours, wages, and other forms of earnings such as tips,

bonuses, commissions, and overtime premia. This measure is preferable to the straight hourly wage

(or hourly equivalent of a non-hourly salary) since it includes premium compensation that workers

may be willing to bear greater scheduling risk in order to obtain. For example, some organizational

studies find that workers routinely pick up extra hours in order to receive overtime pay (Clawson

and Gerstel 2014).

Job retention

I derive an indicator of job retention from the unique employer identifiers (YEMP_UID) in

consecutive rounds of the study period. The indicator equals 1 when the employer ID for the main

job in round t matches the corresponding ID in round $t - 1$, roughly two years earlier. The

indicator equals 0 when the respondent is no longer employed in the same main job as the preceding

round. If the respondent is missing from the analytic sample in either round, the retention outcome

is also treated as missing. In effect, I assume that scheduling risk only affects job retention within

two years of exposure.

Beneficial flexibility

My measure of beneficial flexibility comes from a different subsection of the NLSY97

questionnaire than the items on schedule control and advance notice. It is an indicator of whether or

not the respondent selects "a flexible work schedule" from a list of job benefits that "it would be

possible for [the respondent] to receive." The interviewer refers to a showcard that lists a flexible

schedule along with health, dental, and life insurance; paid and unpaid parental leave; tuition

reimbursement; childcare; and an employee stock ownership plan as "benefits which employers

sometimes make available to their employees." Although the questionnaire does not define a flexible

work schedule, the context implies a kind of flexibility that the employer provides for the benefit of

the employee. Moreover, this beneficial flexibility is presented as distinct from paid parental leave, sick days, and vacation time, which are separate items in the list of potential benefits.

Job satisfaction

Employed respondents are asked how they feel about their job on a five-point scale from "like it very much" to "dislike it very much." Since very few respondents report disliking their current job, I convert this to a dichotomous measure that equals 1 only for the highest level of satisfaction.

Moderator variables

I use two proxies for worker or employer bargaining power to test hypotheses 5 and 6 based on contested exchange theory. *Union coverage* is an indicator of whether or not the main job is "covered by a contract that was negotiated by a union or employee association" (YEMP-101100). *Local unemployment* is the percentage of the labor force actively seeking work in the city or county where the respondent resides at the time of the interview. This is a restricted-use variable calculated by the BLS based on data from the Current Population Survey and location information contained in the NLSY97 Geocode data (BLS 2020b). While these measures capture different forms of power—respectively, the "associational power" of organized workers and the "short-side power" of employers in a slack labor market—both are commonly used proxies for bargaining power in employment relations (Bowles and Gintis 1993; LaBriola and Schneider 2020; Wright 2000).

Identification strategy

I exploit the longitudinal nature of the NLSY97 data to identify causal effects of schedule arrangements on benefits and pay. For hypotheses 1–4, the estimands of interest are expected differences in potential compensation between a job with a stable schedule and one with an unpredictable, unstable, or erratic schedule, among employees in the 1980–1984 birth cohort. I

70

identify these compensation differentials with the marginal effect of a change in schedule type *within employees* from one survey round to the next, holding constant potential confounders. I estimate marginal effects at the mean (MEM) using ordinary least squares regression with a fixed-effects estimator and, in my preferred specification, an array of covariates (Mize 2019). This design controls for observed time-varying confounders as well as unobserved individual traits such as personality and cognitive ability. My identification strategy relies on the assumption that the same scheduling "treatments" have homogeneous effects across the cohort population (Hong 2015).

$$\ln(Y_{it}) = \alpha_i + \gamma_t + \mathbf{Z}_{it}\boldsymbol{\delta} + \mathbf{X}_{it}\boldsymbol{\beta} + \epsilon_{it} \tag{2}$$

Equation 2 represents the two-way fixed-effects (TWFE) model that I use to estimate pay differentials for unstable schedules as predicted in my first hypothesis. I regress the natural logarithm of hourly pay for employee i in survey year t on contemporaneous schedule characteristics $\mathbf{Z}_{it}$ and controls $\mathbf{X}_{it}$. The coefficients of interest ($\boldsymbol{\delta}$) are estimated net of an individual fixed effect α_i and year fixed effect γ_t with residual error ϵ_{it}. This model simultaneously estimates seven coefficients in $\boldsymbol{\delta}$ corresponding to the three main schedule indicators and their interactions. I then combine these coefficients, setting covariates equal to their respective means, to predict hourly pay for each of the eight schedule types (defined in table 2). Finally, I estimate the marginal effect of each schedule type relative to the reference category of a stable schedule. I repeat this procedure over three specifications of the model: (1) a baseline specification with no controls (except for person fixed effects), (2) a reduced specification with some controls (including year fixed effects), and (3) my preferred specification with the full set of controls described in the following section. I use robust standard errors clustered at the individual level for statistical inference.

For the dichotomous outcomes—job retention, beneficial flexibility, and job satisfaction—I use a linear probability model (LPM) to the estimate average partial effects of schedule arrangements. Equation 3 represents a static version of this model where the probability of "success" (e.g., the highest level of job satisfaction) is a function of contemporaneous predictors and two-way fixed effects. The LPM avoids the incidental parameters problem with individual fixed effects and obviates the need to rescale estimates of interaction terms in non-linear (logit or probit) models (Allison 1999; Breen, Karlson, and Holm 2018; Wooldridge 2010). My use of cluster robust standard errors addresses heteroskedasticity and autocorrelation concerns.

$$\Pr(Y_{it} = 1 | \alpha_i, \gamma_t, \mathbf{Z}_{it}, \mathbf{X}_{it}) = \alpha_i + \gamma_t + \mathbf{Z}_{it}\boldsymbol{\delta} + \mathbf{X}_{it}\boldsymbol{\beta} \tag{3}$$

I employ an alternate model for job retention since my interest is with the effects of scheduling risk on subsequent retention. Equation 4 represents a dynamic LPM, which predicts the probability of job retention in round $t + 1$, conditional on job characteristics in round t and other controls in round $t + 1$. Here the control variables comprise two vectors: $\mathbf{W}_{it}$, which precedes the outcome, and $\mathbf{X}_{it+1}$, which is contemporaneous or possibly antecedent to it. Besides ensuring the temporal precedence of my explanatory variables, this lag structure controls for changes that are likely to affect retention but arguably independent of prior schedule arrangements. An example would be the birth of a child, which I presume to be related to contemporaneous schedule arrangements and job retention since the previous round, but independent of prior schedule arrangements.

$$\Pr(Y_{it+1} = 1 | \alpha_i, \gamma_{t+1}, \mathbf{Z}_{it}, \mathbf{W}_{it}, \mathbf{X}_{it+1}) = \alpha_i + \gamma_{t+1} + \mathbf{Z}_{it}\boldsymbol{\delta} + \mathbf{W}_{it}\boldsymbol{\lambda} + \mathbf{X}_{it+1}\boldsymbol{\beta} \tag{4}$$

To test hypotheses 5 and 6, I shift my focus from the marginal effects of unstable schedules to the moderating effects of worker power on compensation. Here the estimands of interest are

differences in potential compensation between stable and unstable schedules for workers with

different levels of bargaining power. I identify the effect of this "contextual moderator"—the local

unemployment rate in the case of hypothesis 5—as the expected change in the compensation

differential of an unstable schedule for a unit change in the unemployment rate (Hong 2015). To

estimate the moderation effect of unemployment on pay, I add to the model represented by

equation 2 the continuous local unemployment rate and all possible interactions with the treatment

vector $\boldsymbol{Z}_{it}$. The coefficients in $\boldsymbol{\delta}$ now comprise 15 partial effects (4 main effects, 6 two-way, 4 three-

way, and 1 four-way interaction effect). I calculate the moderation effect as a linear combination of

these partial effects, again setting covariates equal to their respective means.

$$\theta = [\text{E}(Y_{\text{unstable}} - Y_{\text{stable}}|\text{Union})] - [\text{E}(Y_{\text{unstable}} - Y_{\text{stable}}|\text{Non-union})] \qquad (5)$$

Equation 5 provides a simplified formula for the moderation effect as the predicted margin

of differential compensation, say beneficial flexibility, between a stable and unstable schedule for

union and nonunion jobs. Hypothesis 6 implies that $\theta > 0$ since the compensation penalty for

schedule instability is expected to be smaller with union coverage than without it. Given the FE

design of the underlying model, the marginal effects and predicted contrast between them use only

within-employee variation. This means the moderation effect should not be interpreted as an overall

comparison of beneficial flexibility for union and nonunion workers. Instead, it represents the

expected change in compensation for an unstable schedule relative to a stable one accompanying a

change from nonunion to union coverage, among otherwise equivalent jobs.

Control variables

To bolster my identification strategy, I control for demographic and job characteristics that

may confound the causal effects of scheduling risk on compensation. Stable characteristics such as

race, ethnicity, and gender are absorbed by the person fixed effects included in all models. For time-varying characteristics, I include controls for many relevant observables in the full model, reporting the results alongside a reduced model that omits covariates with less complete data. I also estimate a baseline model with person fixed effects but no time-varying controls.

I control for the following personal and household characteristics: age, education, enrollment in classes or training, being married, having a biological child under eighteen, residing with a child under six, residing in an urban area, Census region, and years of work experience since age twenty. The full model also controls for the following characteristics of the main job: hourly pay status, full-time hours (at least thirty-five in a normal week), any usual overtime pay, medical benefits, paid parental leave, paid time off, a nonstandard shift, union coverage, multiple employer locations, workplace size, industry, and occupation. Because of greater missingness, I drop workplace size, multiple employer locations, union coverage, and nonstandard shift timing from the reduced version of the model.

I transform some continuous variables to improve normality or linearity. I control for the square root of years of work experience, age in fractional years and years squared, and the natural logarithm of the number of employees in the workplace. I convert other covariates into indicator variables to control for differences between discrete levels or groups. For education, I use a pair of indicators to control for having at most a high school degree or at least a bachelor's degree, treating some college as the reference category.

My models distinguish between five major occupational groups (management and professional, sales and office, production and transportation, service, and other) and thirteen industries (agriculture, construction, manufacturing, wholesale trade, retail trade, transportation and utilities, information, finance and real estate, professional and scientific, education and health care,

74

entertainment and hospitality, public administration, and other) based on the 2002 Census classification (BLS 2020a).

Results

In this section I present results on the prevalence, effects, and moderation of scheduling risks captured by my typology of schedule arrangements. I begin with descriptive statistics on the prevalence of unpredictable, unstable, and erratic schedules across demographic, job, and labor market characteristics. These tabulations provide preliminary evidence of compounding disadvantage but also cross-cutting patterns of stratification in scheduling risk. I proceed to the results of regression analyses that identify the marginal effects of scheduling risk on pay, job retention, beneficial flexibility, and job satisfaction, controlling for observed job characteristics and unobserved heterogeneity between employees. I then test for moderating effects of worker and employer power, as reflected in union coverage and local unemployment rates.

Descriptive analyses of scheduling risk in a stratified labor market

Table 3 shows the prevalence of risky schedule arrangements across groups defined by sex, race, education, and an array of job or labor market characteristics. As in previous research, I find a pattern of compounding disadvantage with scheduling risk concentrated on already marginalized workers (McCrate 2012; Storer et al. 2020). This pattern is clearest in the last column, which shows the prevalence of erratic schedules (little or no employee control, one week or less advance notice, and weekly hours that vary by 25 percent or more in the past month).

Table 3. Prevalence of scheduling risk by demographic and labor market characteristics

Characteristic	**Group**	Unstable %	Unpredictable %	Erratic %
Sex	Men	33***	23***	14***
	Women	27	15	8
Race	Asian	24	13	7*
	Black	35***	26***	15***
	Hispanic	29	24***	13**
	White	29	16	10
	Other	28	19	10
Education	HS or less	38***	31***	19***
	Some college	31	19	12
	BA or higher	23***	8***	4***
Wage	< $15	38***	30***	18***
	≥ $15 but < $25	27	15	9
	≥ $25	23**	8***	5***
Union	Covered	35***	17	10
	Not covered	28	17	10
Contract type	Traditional	28***	17***	10***
	Non-traditional	47	34	24
Usual hours	Part-time (< 35/wk.)	48***	29***	22***
	Full-time	26	17	9
Shift type	Regular day	24***	14***	8***
	Regular non-day	47	28	18
	Rotating or irregular	39***	24*	17
Workplace size	1–9 employees	28	21	13
	10–49	30	20	12
	50–249	29	17**	9*
	250+	27*	11***	6***
Unemployment	< 6 % locally	27***	15***	9***
	6 % or higher	33	24	14

Note: Percentages estimated for pooled sample using 1997 base weight (R1236101). Number of observations varies by row group and column due to missingness on source variables. Italicized group serves as reference category for multiple contrasts. Significance levels based on design-adjusted, two-tailed t tests. *** p<0.001, ** p<0.01, * p<0.05

I find large disparities in exposure to scheduling risk by education, contract type, usual hours, and wage levels. Among workers with a high school education or less, 19 percent report an erratic schedule on their main job, compared with 4 percent of workers with a BA or higher degree. Scheduling risk is most prevalent among workers with a "nontraditional" contract (i.e., independent contractors, day laborers, or on-call workers), 24 percent of whom have an erratic schedule. I find a similar disparity by usual work hours, with 22 percent of part-time workers reporting an erratic schedule compared with 9 percent of full-time workers. We see somewhat smaller but still considerable disparities by race and shift type. While 10 percent of White workers report an erratic schedule, for Black workers, the rate is 15 percent.

There are exceptions to the pattern of compounding disadvantage. Erratic schedules are more prevalent among men (14 percent) than women (8 percent). And even relatively advantaged groups report substantial levels of scheduling risk. Workers with a regular daytime shift are far less likely than those with a regular evening or night shift to experience unpredictable or unstable schedules. Still, 14 percent of daytime workers report an unpredictable schedule with a week or less advance notice, and 24 percent report unstable hours with considerable volatility. Across all these groups, unstable schedules are more prevalent and exhibit smaller disparities than unpredictable arrangements.

These descriptive statistics give some indication of the overall relationship between scheduling risk, compensation, and bargaining power. Table 3 suggests a negative association between unpredictability and pay. Comparing workers in the bottom third of the pooled wage distribution with those in the top quarter, I find those paid less than $15 per hour report unpredictable schedules at three times the rate of those paid $25 or more (30 versus 8 percent).

77

Given this stark inequality and the macroeconomic relationship between wages and unemployment, it is not surprising to see that scheduling risk is also more prevalent in areas with high unemployment rates. Perhaps more surprising is the lack of a similar contrast with respect to union coverage, which tends to protect workers from labor market risk (Jacoby 2001; Kalleberg 2018). Both union and nonunion workers report similar rates of unpredictable schedules, although union workers are somewhat more likely to report unstable schedules (35 versus 28 percent). Of course, these workers differ in many other respects that a simple crosstab does not take into account.

Regression analyses of schedule effects on compensation

For a more rigorous evaluation of compensation for scheduling risk, I turn to regression analyses that estimate the effects of unstable schedules on benefits and pay within employees. I focus on the contrast between a stable schedule (with employee control, > 1 week advance notice, and < 25% volatility) and other schedule arrangements, defined by different combinations of the three main indicators and their interactions. Appendix C reports the partial effect estimates from which I derive the marginal effects at the mean (MEM) presented below.

I begin with the most straightforward form of labor compensation—hourly pay. Figure 2 summarizes the predicted pay differentials for each schedule type across the three specifications of my model: no controls, some controls, and full controls (see appendix C for a list of covariates included in each model). I plot the point estimates as markers and 95 percent confidence intervals (based on clustered robust standard errors) as horizontal lines, whose shape and shade differ by model specification. I express the marginal effect as a percent of pay with a stable schedule, so the "differential" for a stable schedule is zero by definition. For the other schedule types, the farther the marker lies from zero, the larger the predicted effect size. If a confidence interval overlaps with zero, I infer that the effect is not significant at the (two-tailed) $p < 0.05$ level.

I find few significant pay differentials. Workers with unstable schedules receive approximately the same predicted pay per hour as workers with a stable schedule, despite having less control or more volatile hours of work. Where there are significant differentials, they run counter to the prediction of hypothesis 1. Jobs with unpredictable schedules have lower pay than comparable jobs with stable schedules, at least in the baseline and reduced versions of my model. However, this pay penalty is attenuated by the addition of controls, particularly in the full model that includes days of paid time off and medical benefits. The absence of a significant pay differential for unpredictable schedules in the full model suggests that scheduling risk is associated with a lack of benefits, but conditional on an average benefits package, different schedule arrangements have no marginal effect on pay.

Figure 2. Hourly pay margins by schedule type and model
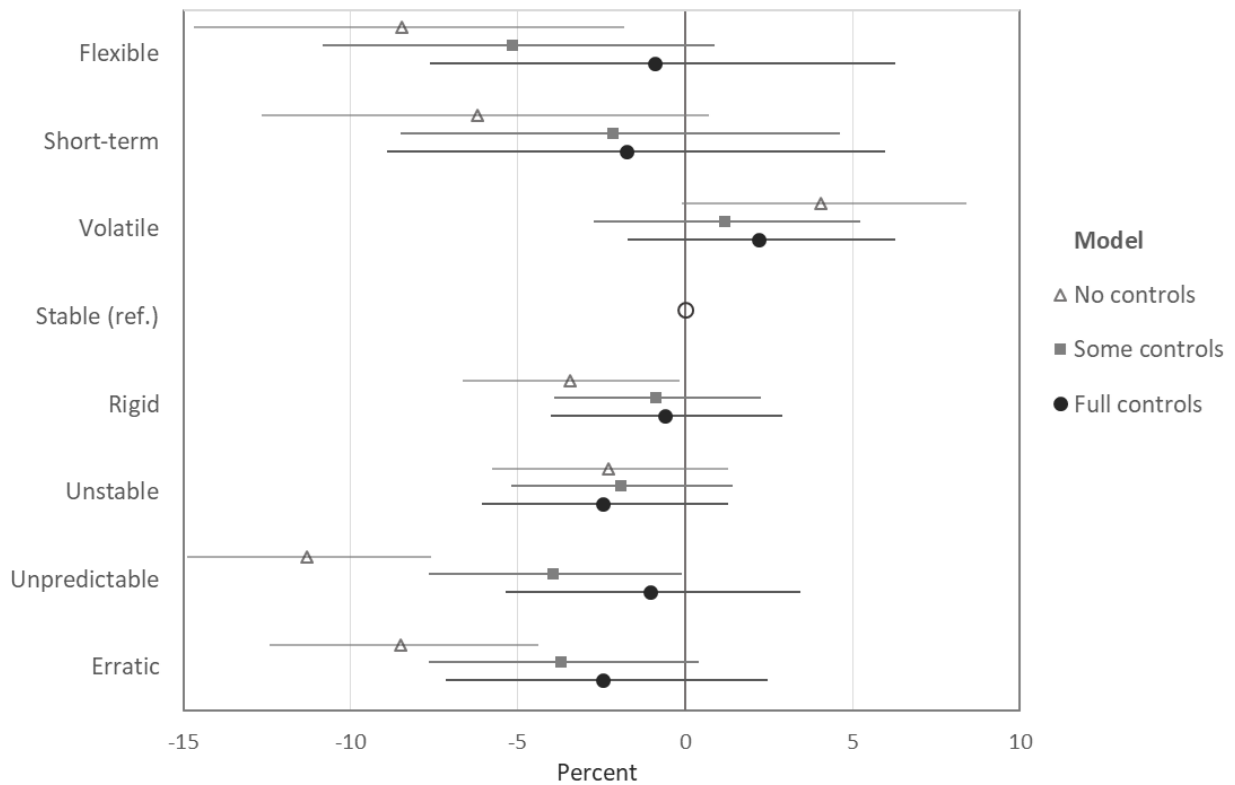
To put these marginal effects in terms of dollars and cents, table 4 reports the predicted pay for each schedule type at covariate means using the reduced model. I estimate hourly pay with an unpredictable schedule to be $18.37, which is −3.95 percent lower than the predicted pay with a stable schedule ($19.13). The only marginal effect larger in magnitude is for a flexible schedule type (with employee control, short notice, and volatile hours). However, the confidence interval contains zero for this and the other marginal effects, indicating that hourly pay for these schedule types is not significantly different from comparable jobs with a stable schedule.

Table 4. Predicted hourly pay margins by schedule type

Schedule type	E($/hour)	Differential (% stable)	95% C.I.		z statistic	p value
Flexible	18.14	−5.16	[−10.84,	0.89]	−1.68	0.093
Short-term	18.71	−2.16	[−8.51,	4.64]	−0.64	0.524
Volatile	19.35	1.18	[−2.73,	5.25]	0.58	0.559
Stable	19.13	0.00				
Rigid	18.96	−0.87	[−3.90,	2.25]	−0.56	0.579
Unstable	18.76	−1.94	[−5.19,	1.43]	−1.14	0.255
Unpredictable	18.37	−3.95	[−7.65,	−0.10]	−2.01	0.044
Erratic	18.42	−3.70	[−7.65,	0.42]	−1.77	0.077

Note: Predicted hourly pay based on reduced model with covariates at their respective means. Differentials expressed as a percent of pay with a stable schedule. Cluster robust 95% confidence intervals in brackets. P values based on two-tailed z tests. See table 2 for definition of schedule types.

Turning from monetary to nonmonetary compensation for scheduling risk, I now examine job retention, defined as remaining with the same employer from one survey round to the next (approximately two years later). Figure 3 plots the marginal effects of schedule types on the probability of job retention on the percentage scale. Again, there are few significant differences between jobs with stable and other schedule arrangements. In some specifications, I find a marginal effect of unpredictable and erratic schedules on the order of −10 percentage points. However, this effect is not robust to different sets of controls.

Figure 3. Job retention margins by schedule type and model
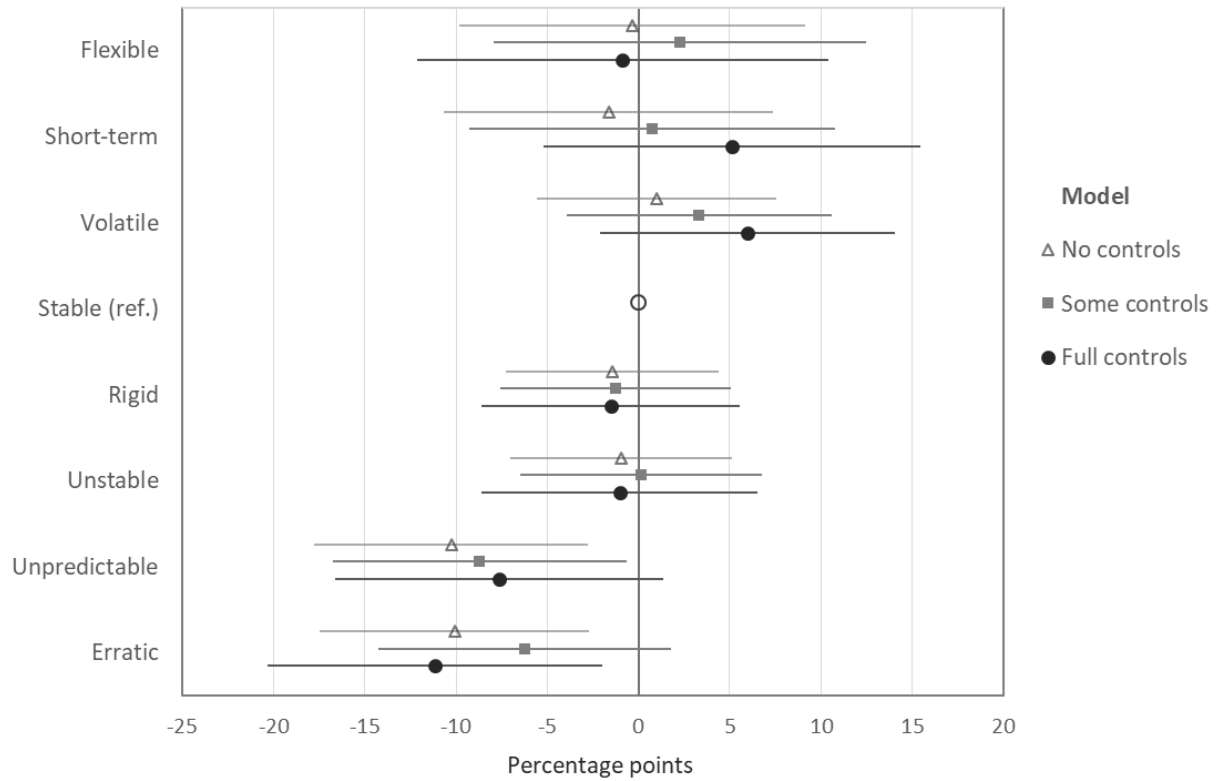
Table 5 provides numerical estimates of the job retention probability and marginal effect of each schedule type based on the full model. At average values of covariates, I predict the probability of job retention to be 0.655 with an erratic schedule (outside control, short notice, and volatile hours)—11.2 percentage points lower than the probability of retention in a job with a stable schedule (0.767). This effect size is roughly equivalent to the difference in average job retention rates between health and education (0.854) and retail establishments (0.748) over a similar period (Lazear and McCue 2018). While employees in the NLSY97 cohort are more likely than not to remain in their main job (albeit at lower rates than older workers), I predict a third of those with an erratic schedule will leave their job in the span of two years. Contrary to hypothesis 2, scheduling risk is not

offset by greater job retention, which would be a precondition for promotion and other forms of deferred compensation.

Table 5. Predicted job retention margins by schedule type

Schedule type	Pr(Y=1)	Difference*100	95% C.I.		z	p
Flexible	0.758	−0.86	[−12.2,	10.4]	−0.15	0.881
Short-term	0.818	5.13	[−5.19,	15.5]	0.97	0.330
Volatile	0.826	5.96	[−2.12,	14.1]	1.45	0.148
Stable	0.767	0.00				
Rigid	0.752	−1.50	[−8.57,	5.57]	−0.42	0.677
Unstable	0.756	−1.04	[−8.59,	6.51]	−0.27	0.788
Unpredictable	0.690	−7.63	[−16.6,	1.37]	−1.66	0.097
Erratic	0.655	−11.2	[−20.4,	−2.01]	−2.39	0.017

Note: Predicted probabilities of remaining with same employer in subsequent survey round, based on full model with covariates at their respective means. Marginal differences with respect to a stable schedule are expressed on percentage scale. Cluster robust 95% confidence intervals in brackets. P values based on two-tailed z tests.

I next examine beneficial flexibility as reported by employees. This measure is collected separately from schedule control, but I expect them to be closely related. My theoretical distinction between flexibility for the worker and optionality for the employer hinges on control over schedule variation. Moreover, the claim that workers accept unstable schedules in return for greater flexibility is central to debates around scheduling regulation. My analysis confirms there is a strong relationship between schedule control and beneficial flexibility, but it defies the predictions of efficient contract theory. Employer or outside control over starting and ending times has a strong *negative* effect on beneficial flexibility for employees.

Figure 4 summarizes the marginal effects of schedule arrangements on beneficial flexibility. In all model specifications, I find significant reductions in expected beneficial flexibility for rigid, unstable, unpredictable, and erratic schedules. This reduction is consistently around −20 percentage points for rigid and unpredictable arrangements, −15 percentage points for unstable arrangements,

and −10 percentage points for erratic arrangements. These results represent strong evidence against the hypothesis that workers are rewarded for scheduling risk with beneficial flexibility. The absence of positive marginal effects for volatile or flexible schedule types (with control, short notice, and volatile hours) reinforces the critical importance of schedule control for beneficial flexibility. Conditional on being able to decide their schedule freely or within certain limits, employees are no more likely to report beneficial flexibility with volatile than with more stable hours.

Figure 4. Beneficial flexibility margins by schedule type and model
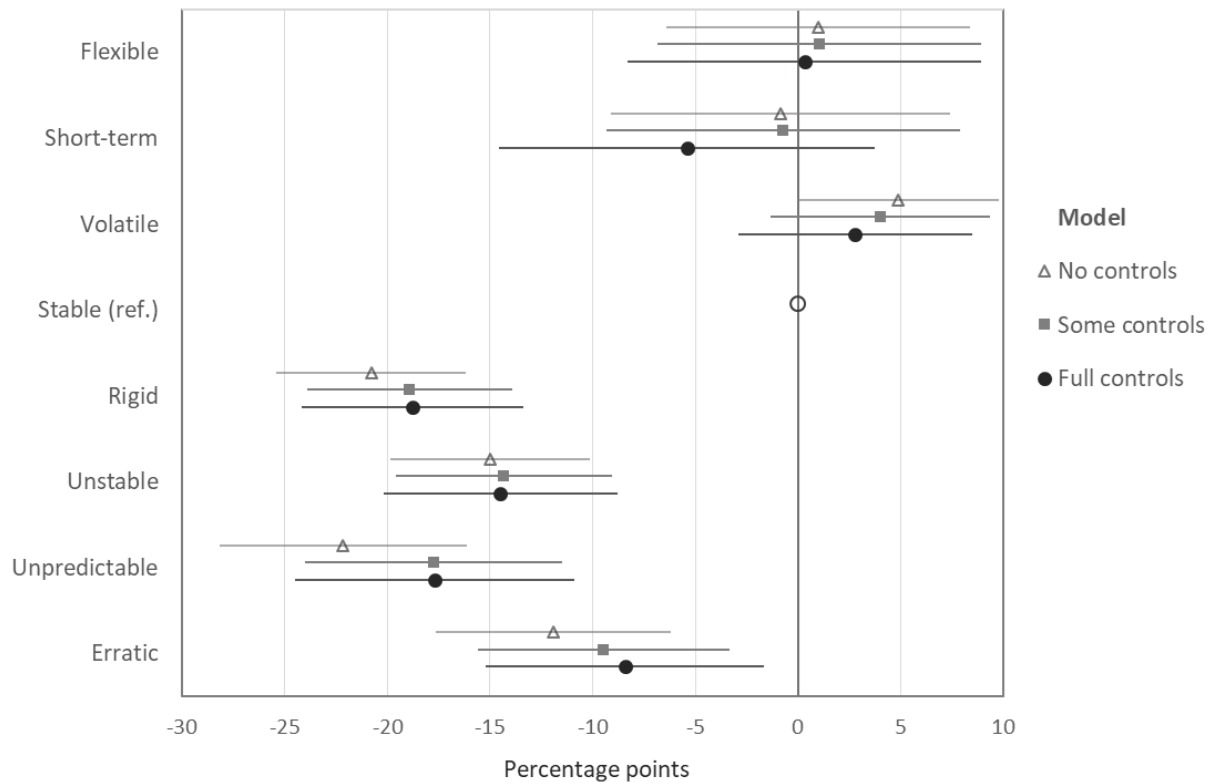
I report the precise marginal effects and predicted probabilities of beneficial flexibility from the full model in table 6. The difference in the probability of beneficial flexibility with a rigid versus a stable schedule provides an estimate of the negative effect of outside control (−18.8 percentage points). Workers in unstable and unpredictable arrangements have similarly low probabilities of

beneficial flexibility (below 0.5). Interestingly, I find that erratic schedules result in a smaller

flexibility penalty than rigid schedules ($-8.4 + 18.8 = 10.4$ percentage points, two-tailed $p < 0.001$).

Conditional on having little or no schedule control, employees are more likely to report beneficial

flexibility with volatile hours than a more rigid arrangement. This suggests there is a grain of truth to

the claim that workers enjoy greater flexibility with variable schedules—not categorically, as implied

by hypothesis 3, but in a more limited comparison between schedule arrangements with little to no

employee control.

Table 6. Predicted beneficial flexibility margins by schedule type

Schedule type	Pr(Y=1)	Difference*100	95% C.I.		z	p
Flexible	0.573	0.32	[−8.29,	8.92]	0.07	0.942
Short-term	0.516	−5.4	[−14.5,	3.74]	−1.16	0.247
Volatile	0.597	2.78	[−2.92,	8.48]	0.96	0.339
Stable	0.570	0				
Rigid	0.382	−18.8	[−24.2,	−13.4]	−6.81	0.000
Unstable	0.425	−14.5	[−20.2,	−8.8]	−4.98	0.000
Unpredictable	0.393	−17.7	[−24.5,	−10.9]	−5.08	0.000
Erratic	0.485	−8.42	[−15.2,	−1.66]	−2.44	0.015

Note: Predicted probabilities of reporting a flexible work schedule as a job benefit, based on full
model with covariates at their respective means. Marginal differences with respect to a stable
schedule are expressed on percentage scale. Cluster robust 95% confidence intervals in brackets. P
values based on two-tailed z tests.

Having found no evidence of compensating differentials in the form of premium pay, job

retention, or beneficial flexibility, I now consider whether other, possibly unobserved forms of

compensation offset the disutility of scheduling risk, resulting in equivalent levels of job satisfaction

with stable and unstable schedules. This fourth hypothesis represents an omnibus test of the

equalizing differences predicted by theories of efficient labor contracts. Figure 5 shows the marginal

effects of schedule arrangements on job satisfaction, measured by the probability of reporting the

highest level of satisfaction.[7] I find a consistent pattern of lower job satisfaction with greater

scheduling risk. Across specifications, the satisfaction penalty is between −5 and −10 percentage

points for rigid or unstable schedules and −10 to −15 percentage points for unpredictable or erratic

schedules. The exception is the marginal effect of an unstable schedule, which is not significant at

the $p < 0.05$ level in the full model.

Figure 5. Job satisfaction margins by schedule type and model
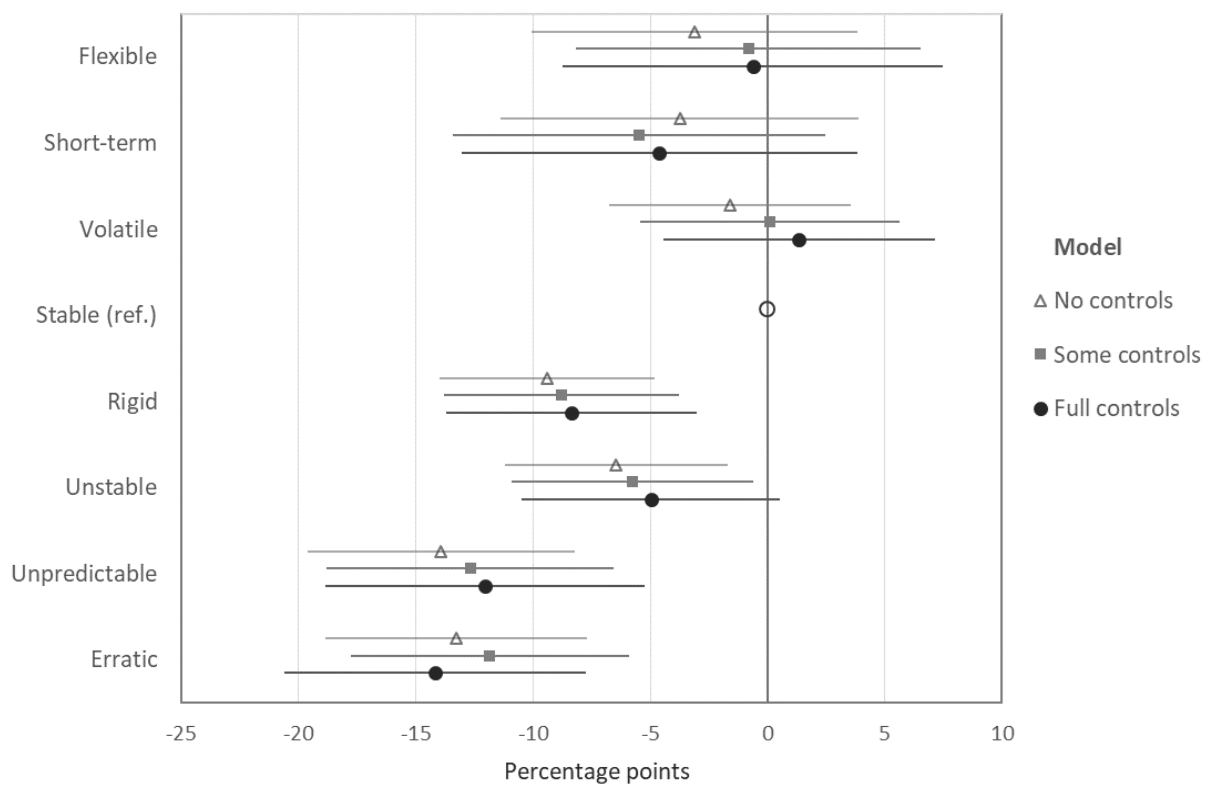
Table 7 provides numerical estimates of expected job satisfaction and differences by

schedule type from the full model. At average covariate values, I predict that 45.7 percent of workers

with a stable schedule like their jobs very much. The predicted probability falls by 8 percentage

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[7] Another set of analyses, not included here, find similar negative effects of scheduling risk on job satisfaction using a continuous Likert scale.

points for workers with a rigid schedule—that is, without control. Satisfaction is lower still with an unpredictable or erratic schedule, bottoming out at −14.2 percentage points below jobs with a stable schedule. It should be noted that the relationship between scheduling risk and job satisfaction is not symmetric between the top and bottom of table 7. I find no significant difference in job satisfaction between stable and volatile schedules, but a nearly 6 percentage point difference between rigid and erratic schedules (two-tailed $p < 0.05$). These results suggest the (dis)utility of variable hours depends on (short) notice and (employer) control. Volatility alone tells us little about the risk-governing functions or effects of schedule arrangements.

Table 7. Predicted job satisfaction margins by schedule type

Schedule type	Pr(Y=1)	Difference*100	95% C.I.		z	p
Flexible	0.451	−0.63	[−8.73,	7.48]	−0.15	0.880
Short-term	0.411	−4.61	[−13.0,	3.83]	−1.07	0.285
Volatile	0.471	1.35	[−4.43,	7.14]	0.46	0.647
Stable	0.457	0				
Rigid	0.374	−8.36	[−13.7,	−3.01]	−3.06	0.002
Unstable	0.407	−4.97	[−10.5,	0.54]	−1.77	0.077
Unpredictable	0.337	−12	[−18.8,	−5.25]	−3.48	0.001
Erratic	0.315	−14.2	[−20.6,	−7.76]	−4.33	0.000

Note: Predicted probabilities of liking job very much, based on full model with covariates at their respective means. Marginal differences with respect to a stable schedule are expressed on percentage scale. Cluster robust 95% confidence intervals in brackets. P values based on two-tailed z tests.

Moderation analyses of schedule penalties in relation to power

The preceding results demonstrate that workers in the NLSY97 cohort do not receive a compensation premium for scheduling risk. On the contrary, they are penalized in the form of lower job satisfaction, less beneficial flexibility, and—in some specifications—reduced pay and job retention. I now consider whether penalties for scheduling risk are moderated by the relative power of workers and employers. I first use local unemployment as a proxy for employers' market power. I then use union coverage as a proxy for workers' associational power. Based on the theory of

86

contested exchange, I predict local unemployment will exacerbate, and union coverage attenuate, compensation penalties for scheduling risk. In this section, I focus on the outcomes most relevant for evaluating market and associational power, respectively: hourly pay and beneficial flexibility.

I first present results derived from a TWFE regression of log pay on the full set of controls and a four-way interaction between the continuous unemployment rate and three schedule indicators. I tabulate the predicted pay differentials at two levels of local unemployment: low (4 percent) and high (8 percent). These points are roughly one standard deviation below and above the average unemployment rate across the areas where respondents resided during the study period.

Table 8 summarizes the unemployment-moderated effects of schedule arrangements on hourly pay. The first column reports predicted pay differentials relative to a stable schedule in the context of low unemployment. The middle column shows the pay differentials of the same schedule contrasts but in the context of high unemployment. The last two columns display the estimate and standard error of the unemployment moderation effect, defined as the difference in pay differentials between high and low unemployment contexts. Again, I report these differentials as a percent of predicted pay with a stable schedule, although I use the natural log scale for estimation.

As in my previous analyses of hourly pay (cf. table 4), I find few significant differentials by schedule type. When unemployment is low, I predict a pay penalty of -4.67 percent for unstable hours and -7.81 percent for erratic schedules. But I find a positive moderating effect of unemployment on the erratic schedule differential (8.46 percent). This interaction results in a negligible pay differential between erratic and stable schedules when unemployment is high. Contrary to hypothesis 5, unemployment seems to mitigate rather than exacerbate the penalty for erratic schedules.

Table 8. Predicted margins of hourly pay by schedule type and local unemployment rate

Schedule type	Low (4%) unemployment differential (%)	(s.e)	High (8%) unemployment differential (%)	(s.e.)	High – low unemployment differential (%)	(s.e.)
Flexible	1.04	(4.97)	−2.33	(4.19)	−3.33	(5.41)
Short-term	3.01	(6.46)	−6.42	(3.83)	−9.15	(6.33)
Volatile	4.24	(2.56)	−0.301	(2.88)	−4.36	(3.36)
Rigid	−2.45	(1.97)	0.858	(2.5)	3.39	(2.72)
Unstable	−4.67*	(2.19)	−0.967	(2.66)	3.88	(3.17)
Unpredictable	−1.84	(2.88)	−0.253	(2.95)	1.61	(3.66)
Erratic	−7.81**	(2.75)	−0.008	(3.19)	8.46*	(3.66)

Note: Predicted margins of total hourly pay, based on full model with covariates at their respective means. Differences expressed as a percent of predicted pay with a stable schedule. Cluster robust standard errors in parentheses. *** $p<0.001$, ** $p<0.01$, * $p<0.05$

To illustrate the moderating relationship between unemployment and the pay penalty for erratic schedules, I plot in figure 6 the predicted margins across a wider range of unemployment levels. The interaction between local unemployment and the erratic schedule penalty is reflected in the positive slope of the line. When local unemployment is 2 percent, I predict a pay penalty of −10 percent for erratic relative to stable schedules. But this differential shrinks with higher unemployment. Above the sample mean of 6 percent unemployment, the differential is positive but no longer significant at the $p < 0.05$ level, as indicated by the overlap between the shaded confidence interval and the zero percent reference line.

Figure 6. Pay differential for erratic schedules by local unemployment rate
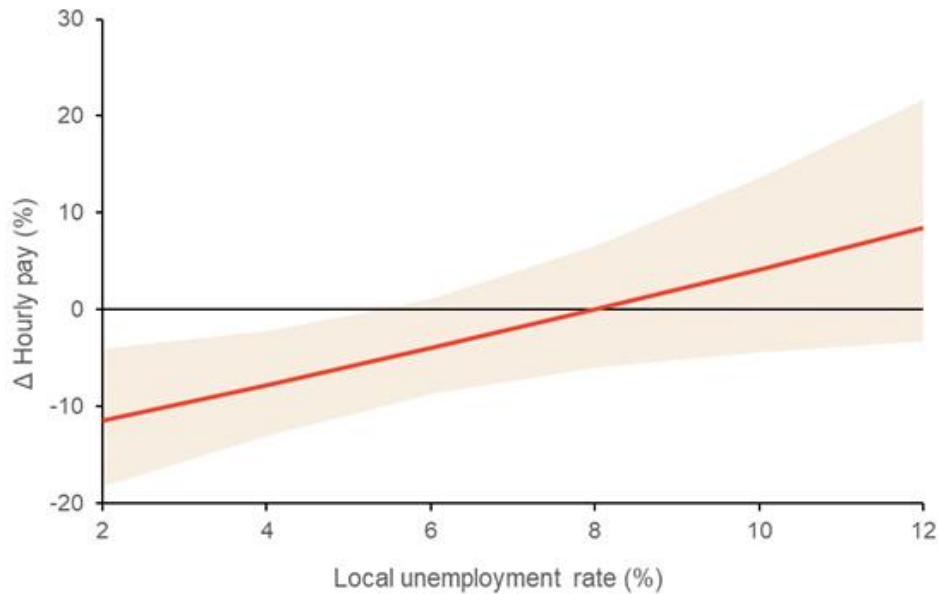
My final set of results concerns an alternate test of contested exchange theory: the hypothesis that union coverage attenuates penalties for scheduling risk. Table 9 summarizes union-moderated differences in beneficial flexibility by schedule type, based on a model with a full set of controls and interaction effects between union coverage and schedule indicators. The three main columns display differences in the predicted probability of beneficial flexibility by schedule type first for nonunion jobs, then union jobs, and lastly, the difference of the union from the nonunion margins. The negative effects of optional arrangements for nonunion jobs are similar to the overall results (see table 6 above), at most a few percentage points smaller. For union jobs, however, the results are strikingly different.

Table 9. Predicted margins of beneficial flexibility by schedule type and union coverage

Schedule type	Nonunion difference from stable	(s.e.)	Union difference from stable	(s.e.)	Union − nonunion difference	(s.e.)
Flexible	0.018	(0.046)	−0.183	(0.131)	−0.200	(0.138)
Short-term	−0.073	(0.047)	0.060	(0.175)	0.133	(0.179)
Volatile	0.032	(0.030)	−0.007	(0.098)	−0.039	(0.102)
Rigid	−0.172***	(0.029)	−0.355***	(0.080)	−0.183*	(0.083)
Unstable	−0.123***	(0.031)	−0.332***	(0.081)	−0.209*	(0.085)
Unpredictable	−0.170***	(0.037)	−0.298***	(0.090)	−0.128	(0.096)
Erratic	−0.063	(0.037)	−0.289**	(0.088)	−0.226*	(0.093)

Note: Predicted margins of reporting job benefit of a flexible work schedule based on model with full set of schedule-by-union interactions and controls. Differences expressed on probability scale. Robust standard errors in parentheses. *** $p<0.001$, ** $p<0.01$, * $p<0.05$

Contrary to hypothesis 6, I find union coverage exacerbates rather than attenuates the penalty with respect to beneficial flexibility for unpredictable and unstable schedules. For rigid, unstable, and erratic arrangements, the negative marginal effect is roughly double with union coverage what it is without such coverage. For unpredictable arrangements, there is less beneficial flexibility relative to stable schedules among union as well as nonunion jobs, but the difference between the union and nonunion margins is not statistically significant.

These results contribute to a consistent albeit unexpected picture of scheduling risk and reward. Compensation penalties aggravate rather than offset scheduling risk. But the magnitude of these penalties is not a simple function of worker or employer bargaining power. Work as an option offers young employees no discernable rewards with respect to benefits or pay. Even when these workers are in a stronger position to demand a risk premium, they fare no better—and in some respects much worse—than they would with a stable schedule.

Discussion

Unpredictable and unstable schedules have received increased scrutiny in recent years from labor scholars, policymakers, and a broader public concerned with job quality, work-life conflict, and labor market inequality. Scheduling instability is now recognized as a social problem that overlaps with and potentially exacerbates more familiar problems of low pay, job insecurity, and a lack of paid time off. This recognition is reflected in a growing body of research on the negative family, health, and economic outcomes associated with unpredictable and unstable schedules (Ananat and Gassman-Pines 2021b; Gerstel and Clawson 2018; Schneider and Harknett 2019). It is also evident in new scheduling regulations, such as the Seattle Secure Scheduling Ordinance and Oregon Fair Workweek Law, which seek to limit or require compensation for problematic scheduling practices, particularly in large retail or restaurant chains. These regulatory efforts have met with powerful opposition from employer associations and their political allies, who defeated previous scheduling proposals in Minneapolis and Washington, DC. A key point of contention in the public debate is whether workers are compensated for otherwise undesirable schedules in the form of beneficial flexibility or greater economic opportunity (American Consumer Institute 2019; Mathur 2017). This question connects to longstanding scholarly debates between efficiency- and power-based theories of the labor market (Bowles and Gintis 1993; Rosenfeld 2021).

The present study clarifies the terms of these debates and evaluates the claim that workers are already compensated for schedule instability. I adapt the notion of "optionality" from finance to model the specific functions of unstable schedules that give employers discretion over the timing and hours of work. Employer control over schedule variation distinguishes unstable schedules from flexible arrangements, which give employees more control, as well as from stable arrangements,

which imply more commitment to a set schedule. I argue that greater conceptual clarity about the functions of unstable scheduling allows for a more precise analysis of its effects.

I provide new evidence that unstable scheduling lowers employee compensation across a range of industries. Using previously unanalyzed data from the National Longitudinal Survey of Youth, I estimate causal effects of schedule arrangements on compensation for a cohort of employees born in 1980–84. I find no evidence of compensating differentials predicted by classic economic theories of efficient contracts (hypotheses 1–4). On the contrary, unpredictable schedules decrease employees' job satisfaction and reduce the availability of beneficial flexibility. Although employers and opponents of scheduling regulation often present flexibility as a benefit of schedule instability, beneficial flexibility is much less available to workers with little or no schedule control. Overall, 49 percent of young employees in this study report a flexible work schedule as a benefit of their job. Unstable schedules lower the likelihood of beneficial flexibility by 14 percentage points; unpredictable schedules lower it by 18 percentage points in comparison with a stable schedule. I also find some evidence of an hourly pay penalty and lower job retention for employees with erratic schedules that combine unpredictable timing with volatile hours. These results suggest that workers have little to lose from fair workweek laws that require advance notice or pay for schedule changes.

My study also challenges power-based accounts of scheduling instability and compensation penalties as a function of employer bargaining power. Where I detect a relationship between compensation differentials and bargaining power, my results run counter to the theory of contested exchange (hypotheses 5–6). Union coverage more than doubles the negative effect of unstable schedules on beneficial flexibility (to −33 percentage points as compared with −12 percentage points for nonunion jobs). And union coverage does not seem to protect workers from exposure to scheduling risk since union workers report a similar rate of unpredictable schedules (17 percent) and

somewhat higher rate of unstable schedules (35 as compared with 28 percent for nonunion workers) in my sample.

Another finding that defies contested exchange theory is the pay penalty for erratic schedules when unemployment is low but not when it is high. Why would workers accept lower pay for scheduling risk only under favorable labor market conditions? My risk-theoretic framework points to an alternative explanation, not in terms of bargaining power, but inefficient instability. Rather than assuming that just-in-time scheduling maximizes employer profit, I posit a trade-off between optionality and commitment, recognizing that excessive instability can be counterproductive when it leads to high turnover and poor performance (Williams et al. 2018). Besides serving as a proxy for employer power, the unemployment rate in the 2010s is a lagging indicator of the economic damage of the Great Recession (Finnigan 2018). If business failures and layoffs are more concentrated among less efficient organizations, then as the economy recovers and unemployment falls, relatively inefficient firms and jobs may expand more rapidly. Lower pay for erratic schedules may reflect a larger share of less productive jobs given more favorable macroeconomic conditions rather than employers driving a harder bargain. Thus, schedule instability and lower compensation may both stem from inefficiencies in the business model of "low-road" employers (Ton 2014).

These unexpected findings reveal the limitations of dominant ways of thinking about labor scheduling. While I consider elements of an alternative approach to account for inefficient instability, I develop these ideas further in subsequent chapters. Doing so requires more institutional and organizational context for evaluating scheduling as a governance problem, not merely a labor contract, as I have analyzed it here. The main contribution of this chapter to my broader argument is to demonstrate that schedule arrangements deviate systematically from the utility- and profit-

maximizing logics commonly invoked to explain why employers offer, and workers accept, work as an option.

Limitations

This study takes advantage of unusually detailed data on work schedules, but these data are limited to a specific cohort of workers born between 1980 and 1984. This cohort was 26–38 years old during the period (2011–2018) covered by my study (BLS 2020a). National data from the Survey of Household Economic Decision-making suggest that the rate of schedule instability is highest among workers under twenty-five, lowest among those in their early forties, and also elevated among those fifty-five or older (Fugiel and Lambert 2019). Given this convex relationship between age and instability, my study of employees in their late twenties and thirties would seem to be a good testing ground for theories of scheduling and compensation. However, if employers compensate middle-aged workers differently from how they compensate younger workers for schedule instability, my findings may not generalize to a broader population.

Even if employers compensate young workers in a similar way to older workers, my results could be biased by selection issues in data collection. While the NLSY97 maintained high response rates (~80 percent) over the study period, some respondents were improperly skipped past scheduling questions due to programming errors. Available evidence suggests that the missing employees have above average rates of schedule instability. This means my estimates of the prevalence of unstable schedules are likely conservative, particularly for subgroups in which overtime is common (e.g., construction and production workers) (McCrate 2018). The key assumption of the analyses reported here is that a more complete dataset would not yield qualitatively different results with respect to compensation. I believe this assumption is warranted since, conditional on observed job characteristics included as controls in my regression analyses, the

excluded respondents have comparable rates of hourly pay, job retention, and beneficial flexibility. The best test of this assumption would be to replicate my regression analyses using an alternative data source, although I am not aware of any with sufficiently detailed, repeated observations on scheduling and compensation.

Despite growing scholarly interest and innovative data collection strategies around scheduling, large gaps remain in the evidence base for scheduling research (Lambert and Henly 2014; Schneider and Harknett 2019). Besides the NLSY97, the most detailed national surveys are the National Survey of the Changing Workforce, for which the last public data release is from 2008, and the Quality of Work-Life Module of the General Social Survey, which has a sample of only several hundred workers for the relevant items (Lambert et al. 2019a). With the removal of the schedule control question from round 19 of the NLSY97, we lose a critical piece of evidence just as a coronavirus pandemic and a new federal administration are elevating concerns over the risks and rewards of frontline service work. Fortunately, there is growing recognition not only of the problem of schedule instability, but also the need for better data on its nature and extent. Most notably, a report by the National Academies of Sciences, Engineering, and Medicine recommends adding questions to the Current Population Survey measuring schedule autonomy, predictability, and volatility (NASEM 2020, 10). With or without new sources of data, future research should compare different ways of operationalizing schedule instability—for instance, as a multinomial typology or a composite index (Schneider and Harknett 2019)—to shed light on their relative merits in theory and practice.

Conclusion

"Who decides when and how long to work?" is a crucial question for labor market scholarship and policy. It touches on fundamental issues of labor supply, employment contracts, and

business operations, especially in a service-based "24/7" economy (Hamermesh 2019; Rubery et al. 2005). It has wide-ranging implications for economic performance, worker welfare, family, and civic life (Boushey 2016; Lambert et al. 2019a; Snyder 2016), and its policy stakes have only become more pressing as a growing number of jurisdictions consider legislation to protect employees against abusive and unpredictable scheduling (NWLC 2019). Despite its importance, research on this topic has been limited by a lack of detailed, national data on schedule control and variation. Few labor force surveys ask about schedule control, and those that do tend to focus on the worker's ability to accommodate commitments outside of work rather than the employer's ability to vary the timing and hours of work (Fugiel and Lambert 2019; McCrate 2018).

In this chapter, I present a study of the functions and effects of unstable schedules that puts employer control at the center of the analysis. I develop a model of "work as an option" to conceptualize how schedule discretion allows employers to realize potential gains while limiting their losses from the labor process. I elaborate a typology of schedule arrangements that distinguishes unpredictable and unstable schedules—characterized by short notice or volatile hours with little or no employee control—from stable schedules and from flexible arrangements, which allow employees more control over schedule variation. I ask how workers are compensated, if at all, for the risks of allowing their employer an implicit option of their time. Drawing on theories of compensating differentials and contested exchange, I formulate hypotheses concerning the form and context in which premium compensation should obtain.

I test these hypotheses using longitudinal data on detailed schedule arrangements from a nationally representative survey of young employees. My findings challenge both efficiency- and power-based theories of the market for working time. On the one hand, I find no evidence of compensating differentials and some evidence of substantial penalties with respect to beneficial

flexibility and job satisfaction, contrary to the predictions of efficient contract theory. On the other hand, I find moderating relationships between schedule penalties and proxies for employer power that are the opposite of what we would expect under contested exchange. Union coverage exacerbates penalties with respect to beneficial flexibility, and high unemployment attenuates the negative pay differential for erratic schedules. These results suggest workers have little to lose and potentially much to gain from fair workweek laws that mandate advance notice or compensation for schedule changes. They also provide a rationale for extending scheduling protections to both union and nonunion workers beyond the relatively narrow segment of retail and restaurant chains targeted by early scheduling legislation (Figart 2017).

In addition to providing empirical evidence that strengthens the case for regulating unstable schedules, this chapter develops an alternative framework for conceptualizing the costs and benefits of schedule arrangements more broadly. I emphasize the routine and contingent nature of unstable schedules, which differ from the secular process of externalizing risk that pervades accounts of "the great risk shift" and employment "precarization" (Hacker 2006; Kalleberg 2018). My model of work as an option calls into question common assumptions that unstable scheduling maximizes employer profits, instead pointing to a trade-off between optionality and commitment as opposing mechanisms for creating value in the employment relationship (Breen 1997; Rubery et al. 2005). Employers who seek to maximize optionality by expanding the pool of available labor beyond what they can reliably employ may suffer from higher turnover and lower productivity as a result of their lack of commitment (Luce et al. 2014; Ton 2014). For some employers, stable scheduling may be a "beneficial constraint" (Streeck 1997), leading them away from inefficient practices by requiring them to bear a greater share of the costs of instability.

Chapter 3. The Emergence of a Precarious Retail Labor Force in the United States, 1900–2019

In the previous chapter, I developed a model of work as an option to analyze the functions and effects on compensation of unpredictable and unstable schedules. The model abstracts from particular occupations and industries in order to test for systematic relationships between risk and reward in schedule arrangements across the contemporary US labor market. My analysis reveals uncompensated risk that defies the logic of classic efficiency and power-based theories of the labor market. However, in most scholarly and public discussion, unstable scheduling is identified with certain industries and jobs whose poor quality results either from the nature of the work or the vulnerability of workers in these jobs to broader shifts in the political economy. In this chapter, I examine a sector that has been central to research and regulatory efforts around unpredictable and unstable schedules: retail trade. I inquire into the origins of common scheduling practices in US retail stores, evaluating them in relation to the changing social organization and institutional context of retail work.

Retail work is commonly viewed as a "bad job" characterized by low pay, high turnover, unstable hours, and a lack of benefits or opportunities for advancement (Carré and Tilly 2017; Misra and Walters 2016; Reich and Bearman 2018). Labor scholars increasingly use the term "precarious" to characterize the poor quality of retail work and similar frontline service jobs (Kalleberg 2018; Milkman and Ott 2014; O'Brady 2019). In the sociological literature, the origins of precarious work are often traced back to the neoliberal turn of the 1970s and 1980s, which strengthened capital relative to labor and shifted risks from employers onto workers and their families (Kalleberg 2009;

Wacquant 1996). But this stylized narrative of precarious work as the result of a structural shift in the balance of class power fits poorly with the historical trajectory of the US retail sector. Rather than a critical break with postwar norms of stable employment, precarious retail work emerges from a confluence of more or less gradual developments in business strategy, consumption patterns, distribution technology, and the composition of the labor force.

Through historical research that draws on work by women reformers and researchers outside of mainstream sociology, I provide a more grounded narrative that recognizes the specificity of retail sales and cashier jobs. I show that instability in retail work long predates the employer mobilization of the 1970s, by which point mostly feminized, part-time work was already widespread among salespersons and cashiers. I also consider why some major changes in organization of retail work, particularly the shift to self-service, met with little opposition, while others—such as the rise of discount chains and just-in-time scheduling—have been contested by retail workers and a broader coalition of middle-class reformers and progressives. This historical study of the US retail labor force points toward a reconceptualization of precarity not as a deviation from an objective standard of stability, but as a chronic mismatch between worker expectations and experiences of their job.

This research is motivated by the puzzle that labor scheduling in retail has only recently emerged as a social problem, though its problematic features have a long history. By surveying this history from 1900 to 2019, I seek to clarify what has and has not changed about retail work in recent decades. While this is a vast area to cover, my aim is merely to map its major contours and prepare the groundwork for subsequent research. I focus on certain features of working time and tenure—part-time hours, high turnover, and contingent or unpredictable scheduling—and their relation to broader developments in retail trade, labor supply, institutions, and technology. My account is telegraphic by necessity, relying on somewhat fragmentary pieces of evidence to trace a larger and

more complex historical process. The justification for my approach is that few contemporary studies have attempted to assemble this evidence or substantiate the stylized narrative of a neoliberal turn in the retail sector. The present study thus represents an early contribution to filling a large gap in existing scholarship on retail labor and working time.

Precarious Schedules as a Product of the Neoliberal Turn

The dominant account of precarious work in the sociological literature adopts a structural perspective that focuses on general shifts in the balance of class power, especially through intensifying market competition, declining union membership, and political realignments (Kalleberg 2009; Vidal 2013; Wood 2020). The rise of precarious work is seen as a product of the *neoliberal turn*, a shift away from the welfarist regime of the postwar era toward a more unstable and market-oriented political economy dominated by multinational corporations. This shift is exemplified by the deregulation, privatization, or restructuring of employment in manufacturing and other industries that were strongholds of labor in the postwar era (Fligstein and Shin 2004). Yet there has been little empirical study of whether and how these shifts were experienced by workers in the service sector or nonunion firms (Windham 2017). This lack of empirical grounding is particularly striking in the retail sector, which is seen as typical of precarious work in the contemporary period but has little in common with the production sector that exemplifies the decline of worker power with the neoliberal turn.

The dominant structural narrative of the rise of precarious work is one of decline and dissolution. It emphasizes employer reaction against the postwar labor-liberal consensus, the breaking up of unions, and the externalization or "fissuring" of peripheral divisions and workers from leading firms refocusing on their core competencies (Weil 2014). But this declension narrative seldom differentiates among the starting points or trajectories of different sectors over this period. It

neglects countervailing developments outside of manufacturing, including conventionally feminine occupations such as secretaries, teachers, and nurses. Recent historical scholarship underscores that it is only during the 1970s and 1980s that public sector unions were legalized and grew rapidly in spite of sometimes hostile political leadership (Windham 2017). Nor does it account for the quite different trajectory of the US retail sector, where labor unions never achieved the level of union density that prevailed in manufacturing, and employers only grew more consolidated and centralized following the repeal of retail price regulations in the 1970s.

Schneider and Harknett (2019) provide a recent example of how the narrative of the neoliberal turn frames contemporary studies of precarious schedules with hardly any discussion of the historical origins of the scheduling practices in question. Their article presents seminal findings from the most comprehensive survey to date of work schedules and job quality in large US retail firms. These findings are presented "against the backdrop" of a broad structural shift with unspecified significance for scheduling:

> From the 1970s through the 2010s, the U.S. labor market experienced a pronounced risk shift from employers to employees, characterized by an increase in job insecurity as well as retrenchment in employer-provided health insurance, retirement plans, and other fringe benefits […] During this period, U.S. workers experienced increasingly precarious employment and higher levels of economic insecurity […] At the same time, the social safety net became a less reliable and less sufficient source of fallback support for low-wage or unemployed workers, and household resources were further stretched by a rise in single-parent families. (2019, 82)

The common theme that connects these concurrent structural, political, and demographic changes is increasing risk and vulnerability. Employers shift risks onto workers just as workers and their families are having to cope with the fraying and disintegration of public and private safety nets. Schedule instability, which the article shows is a strong predictor of economic insecurity and stress, enters this narrative as an aspect of the "increasingly precarious employment" that results from and aggravates the risk shift. It may be too much to expect a groundbreaking quantitative study relevant

101

to contemporary policymaking to also offer new historical perspective on the rise of precarious schedules. But recent qualitative studies that adopt a more critical orientation toward the retail labor process also suffer from similar historical blind spots.

Wood's (2020) *Despotism on Demand* provides a rich comparative study of precarious scheduling and labor relations in a pair of large retailers. He frames his study through an overarching contrast between the "flexible despotism" of his contemporary cases and the more standardized and conciliatory "hegemony" that prevailed in the postwar era. But here again there is a disconnect between Wood's empirically grounded account of contemporary retail labor and the largely abstract concept of hegemony with which it is contrasted. Whereas he details specific staffing and scheduling practices that serve to flexibly discipline hourly workers while obscuring store managers' despotic control, he offers little explanation of how retail employers and unions achieved a "concrete coordination of interests and a stable compromise equilibrium" in the middle of the twentieth century (2020, 50). He repeatedly invokes the "end of hegemony" as an epochal transition from the postwar to the contemporary "flexible accumulation" regime. But the examples he cites of hegemonic control are drawn from industrial ethnographies (e.g., "production games") or organizational theories (e.g., labor market dualism) that were primarily concerned with manufacturing (Burawoy 1979; Piore and Sabel 1984).

If we suppose (as Wood does) that similar labor arrangements existed in retail as in production firms during the postwar era, then the contemporary situation appears a dramatic departure. But there are, by Wood's own account, reasons to doubt this premise. Scheduling issues receive scarcely any attention in classic industrial studies (Hodson 2001), which raises the question of whether scheduling was unproblematic or merely neglected by scholars with other interests. Wood shares personal correspondence with Burawoy, who admits that he took the stability of

working time for granted and "could not imagine the scheduling nightmare" that Wood documents among retail workers (161). Another reason to doubt the premise of parallel trends in retail and manufacturing is that the labor processes differ in fundamental respects, implying different functional constraints on the staffing strategies of profit-maximizing employers. Wood alludes to this difference in his discussion of the "triangular relationship among managers, workers, and customers" in the service sector (14). Retail sales require the more or less synchronous coordination of workers and customers, whereas the production of goods is functionally and often temporally distinct from their sale (Grugulis and Bozkurt 2011).

I cite these studies not to single out the authors, but to illustrate a common limitation of recent sociological literature on precarious labor, even studies that considerably advance our understanding of contemporary retail work and scheduling. Scholars who adopt an explicitly macro-structural approach often concede that the narrative of decreasing power and increasing precarity fits certain groups of workers better than others (Kalleberg 2011). White, male production workers are the protagonists of this narrative, whereas women and racial minorities occupy a doubly marginal position, excluded from many of the benefits of postwar institutions yet more vulnerable to the precarity of the neoliberal era. Perhaps the most sophisticated narratives of precarization are developed by scholars who focus specifically on women temp workers, migrant farm workers, and other groups that do not fit the mold of Fordist manufacturing (Hatton 2011; Hyman 2018).

Alternative narratives of precarious work

Studies of "atypical" workers richly document how insecure forms of employment may be experienced as more or less precarious according to the cultural context and subjective orientation of workers. More thematically, authors in this vein emphasize the contradictory character of changes in the nature of work. They tell an ironic narrative of twenty-first-century insecurity as the perverse

realization of twentieth-century aspirations to emancipate individuals—particularly housewives—from the strictures of postwar paternalism and bureaucracy (Hatton 2011; Hyman 2018). Precarity figures here as an ambivalent experience of independence in which the freedom to chart one's own course is bound up with the perils of disorienting uncertainty and paralyzing anxiety (Sennett 2006). But it would be a mistake to conclude that the attractions of atypical work are illusory or a reflection of false consciousness on the part of workers. In comparison with the exclusivity and rigidity of the postwar "Golden Age," temp work or independent contracting in the "New Economy" represent an expansion of opportunity for many workers (Snyder 2016).

I see the literature on temps and other atypical workers as a better point of comparison for the history of retail labor than the industrial workers that form the basis for structural accounts of precarity. By the 1950s, large retailers had already widely adopted nonstandard employment as a component of their staffing strategy. But this strategy typically relied on segmentation of the workforce into a core group of regular, full-time workers and a contingent pool of part-time or temporary "extras." What changed over the latter half of the twentieth century was the spread of part-time and unstable work into once "core" areas of retail. This transformation proceeded through a confluence of secular, if at times uneven, developments: the substitution of customer self-service and cashier jobs for skilled salespeople; the rise of discount retailing with an increasingly "lean" staffing model; the casualization of retail work through recruitment first of White women and students, then workers of color; the de-personalization of scheduling through increasingly centralized and digitized systems; and rising expectations of some retail workers either for stable hours to earn a livelihood or flexibility to accommodate nonwork roles. Rather than a dramatic break with established norms—like President Reagan firing the PATCO strikers—the emergence of

a precarious retail labor force was a gradual process that occurred over decades and had numerous, sometimes obscure protagonists.

Re-conceptualizing precarious labor

In an influential formulation, Kalleberg defines precarious work as "uncertain, unpredictable, and risky from the point of view of the worker" (2009, 2). Despite the ostensible worker-centered perspective, the structuralist character of Kalleberg's account is evident in his use of the postwar standard employment relationship as an objective reference point for evaluating contemporary job quality. This standard—stable, full-time, long-term employment that provides a decent standard of living through some mix of employer and government benefits—is presumed to be the normative ideal, both for workers who have enjoyed it as well as those less fortunate. This view of the postwar norm as an objective standard complements the declension narrative of precarization as the result of an employer assault on this norm and its institutional supports.

Critics of the structuralist account of precarity tend to emphasize either the role of individual preferences or cultural schemas in evaluating job quality. The former, what we can call the positivist approach, argues that the desirability of alternative work arrangements cannot be determined without analyzing the subjective preferences or observed behavior of individual workers and employers. The other approach—which we can call "constructivist"—attends to the cultural underpinnings of employment norms: the postwar industrial worker-citizen-breadwinner norm as well as the contemporary independent-contract-service worker schema (Vallas and Prener 2012; Vallas and Christin 2018).

I argue that an adequate understanding of the making of precarious retail labor requires a reconceptualization of precarity in more processual terms. Rather than assuming homogeneous interests on the part of stability-seeking workers or labor-cost-cutting employers, we must study how

105

distinct forms of retail employment cohere, transform, and fragment over time. This approach is inspired by Abbott's processual sociology, which conceives of the social world as a dynamic ecology of *lineages*: "local consummations of action and interaction that knot the contingencies of the present into new relations and structures that become the constraints and potentialities of the next moment" (Abbott 2016, 1). Such an approach analyzes taken-for-granted units of social life such as workers, jobs, and organizations as heterogeneous and mutable patterns of events.

I propose a reconceptualization of precarity as a more or less intermittent experience of upset expectations over which the worker has little control. I argue that this expectation-control framework can integrate multiple dimensions of precarious work into a processual theory that avoids some of the limitations of the existing literature. Rather than arraying a given set of nonstandard contracts or disadvantaged workers along a common scale of precarity, my approach identifies precarity in the experience of workers whose jobs frustrate their expectations and elude their control. This approach obviates the structural assumption that the quality of precarious jobs is independent of their incumbents while preserving an ethical concern with worker autonomy. It also relaxes the constructivist assumption that cultural schemas of work commitment pervade every job situation, allowing for different groups and cohorts of workers to form job expectations based on locally salient frames of reference. A processual approach thus reorients the study of precarious work. Instead of asking where bad jobs come from or why workers accept them, it asks how the process of making, remaking, and unmaking jobs goes awry.

From this perspective, retail work becomes precarious not by deviating from the standard full-time workweek or postwar standard of living, but by routinely frustrating workers' expectations and control. Workers have little if any control over much of the instability in the hours and timing of their work, which may vary on short notice and without rhyme or reason. The frustration of this

situation is compounded by the expectation, often deliberately cultivated by employers, that retail offers workers beneficial flexibility. Retailers emphasize temporal flexibility when recruiting, screening, and assessing the performance of hourly workers (Lambert 2008; Ikeler 2016; Williams and Connell 2010). Workers are expected to have "open" or wide availability to work in the course of the week, including evenings or weekends. They are also routinely confronted with schedule changes initiated by managers or co-workers. In exchange for accommodating this instability, workers are told to expect to be able to change their own schedule (Henly and Lambert 2014). But in the absence of meaningful control over scheduling or a work experience that conforms to expectations, instability begets unpredictability and undermines worker autonomy. It is this dual problem of insecurity and lack of autonomy that I seek to clarify through a reconceptualization of precarity.

Changing Evidence on a Changing Labor Force

A general problem in the sociology of work and occupations is that there are shifts in the production of knowledge about occupations, which complicate attempts to construct a cohesive narrative or general causal model (Abbott 2016). This is particularly true of retail sales occupations and, more specifically, working time and tenure within these occupations. The scope and detail of scholarly and official records on working time in retail vary widely over the course of the twentieth century and are extremely limited for earlier periods.

Early accounts of retail work come mostly from social reformers eager to expose the dangers and abuses of long hours, low wages, and poor working conditions of women working in urban department stores (Campbell 1893; MacLean 1899). These accounts are quite limited in scope, reflecting the perceptions and sensibility of progressive patrons as much as the experiences and concerns of workers themselves.

107

In the early decades of the twentieth century, government-sponsored studies provided a fuller picture of retail work and workers in general merchandise and department stores across several cities and states. Research conducted by or under the direction of women in the Bureau of Labor Statistics and the Women's Bureau of the Department of Labor represents an especially rich and innovative source of data, combining field observation and surveys with interviews with retail employers, workers, and their families (BLS 1916; Obenauer 1913; Pidgeon 1933; Sullivan 1936). Although these studies are not designed to be representative of the retail labor force as a whole, they provide a level of detail unmatched by much subsequent research, particularly for women sales clerks and cashiers in large department stores on the East Coast. They are uniquely relevant for my study because they document typical as well as exceptional schedules for both regular and seasonal or contingent workers, at least among women who were most likely to be employed on atypical terms (Benson 1986). Their keen attention to atypical and contingent arrangements makes them an invaluable historical reference for evaluating changes in staffing and scheduling practices.

By the middle of the twentieth century, official statistics on retail and other sectors become more standardized but also more narrowly focused on wages and hours of typical workers. While the Current Population Survey documents the reduction in average weekly hours and increase in the share of retail workers in part-time arrangements, these midcentury statistics offer little information on the consistency or predictability of working time. It is unclear how widespread seasonal, on-call, or other irregular arrangements were until greater scholarly and policy interest prompted the BLS to ask new questions in the Work Schedules, Displaced Worker, and other supplements to the CPS in the 1980s and 1990s. Although belated, these supplements provide more comprehensive evidence of the conditions and extent of precarious retail work. I rely on the Integrated Public Use Microdata

Series (IPUMS) maintained by the Minnesota Population Center for harmonized Census and CPS data used in this chapter (Flood et al. 2020; Ruggles et al. 2020).

The shifting scope and focus of these primary research materials can accentuate the appearance of abrupt change even when the underlying process is secular or gradual. The present study constitutes an effort to triangulate across different data sources and historical periods in order to gain greater perspective on when and how staffing and scheduling practices have changed in the US retail sector. I draw on an array of textual and statistical evidence—Census and BLS data; minutes and reports of retail business and labor organizations; memoirs and biographies of leading figures in the retail sector, labor movement, and allied organizations; and previous historical and interview studies. This study represents an exploratory effort to reconceptualize precarity and construct a more empirically grounded narrative of the transformation of retail labor. Given the wide scope and paucity of prior studies, this effort is limited in many respects. In order to develop a coherent narrative, I have greatly simplified the complexity of my empirical materials, which already lack sufficient coverage or detail to fully support my argument. Perhaps the most significant limitation on this study is the scarcity of evidence of workers' expectations and attitudes toward their jobs.

It should be noted that I adopt a standard definition of retail stores as "establishments engaged in selling merchandise for personal or household consumption and rendering services incidental to the sale of the goods" (Hortaçsu and Syverson 2015). This definition distinguishes retail from wholesale trade, which is exclusive to businesses, institutions, or other formal organizations. In plain language, a retail store is a place anyone can enter to buy things. I exclude eating and drinking establishments since the labor process and typical occupations differ considerably from retail stores. Unless otherwise noted, I use "retail workers" and "retail jobs" to refer only to sales or cashier

positions. This includes antiquated titles such as shop clerk and sales girl, but excludes porters, stockers, managers, delivery, and other ancillary jobs.

Contributions and organization of study

The narrative of this chapter differs from existing accounts of retail labor in the sociology of work and occupations. Whereas most accounts emphasize discontinuities in working conditions due to changes in technology or the balance of class power (Ikeler 2016; Wood 2020), I emphasize more gradual changes in business strategy, consumption patterns, and the composition of the retail labor force. I argue that workers' experience of retail work as precarious is not reducible to objective changes in job structure and scheduling practices, but also reflects their changing social position and job expectations. This argument points toward a broader reconceptualization of precarity as a more or less chronic mismatch between workers' expectations and experience of their work (cf. Snyder 2016; Vallas and Christin 2018).

In developing this account of the origins of precarious scheduling, I contribute new empirical insights into the history of retail labor. I show that many staffing and scheduling practices that provide contemporary retailers with labor flexibility were already common by the middle of the twentieth century. But I also clarify how the changing composition and expectations of retail workers has made scheduling more fraught within major retail firms and more salient to progressive reformers viewing them from without. I draw on early studies of retail stores and workers prepared by women researchers and officials in the Women's Bureau of the US Department of Labor that up until now have been largely neglected.

I organize this narrative into four periods and characteristic retail formats: early twentieth-century department stores, mid-twentieth-century malls, late twentieth-century discount chains, and twenty-first-century e-commerce. Within each period, I discuss concurrent developments in retailing

110

strategies and formats; labor supply and scheduling practices; politics and regulation; and distribution, information, and communications technology. It is the confluence of changes across these domains—not a simple change in the balance of class power—that leads to the emergence of precarious schedules as a social problem. But the degree to which workers experience unpredictable scheduling as precarious depends not only on their working conditions but also on their circumstances outside of work and their orientation toward the future. Workers who do expect their jobs to sustain them economically or set them up for a career in retail may accept unpredictability to have part-time work that can accommodate other commitments until they have a better option.

Department Stores in the Early Twentieth Century

At the beginning of the twentieth century, the retail sector was composed of roughly three types of stores. The first was the general store, which supplied dry goods, farm tools, and other necessities to a rural or small-town clientele. Such stores were typically family businesses with few if any paid employees. The second type was the specialty shop, which sold a narrow line of goods, either produced onsite by craftsmen or acquired by a shopkeeper who acted as a merchant. The master or owner of the shop might employ assistants or clerks in an apprentice role (Bjelopera 2005; Luskey 2010). Such employees worked closely with the shop owner, in some cases eating or living together, and could aspire to take over the shop or start one of their own after some years in the trade. The third type of store was the urban department store, which sold a wide variety of goods on a larger scale than traditional shops. Department stores introduced modern employment relations to the retail sector, employing a large workforce on an hourly wage or commission basis according to a more elaborate division of labor (Benson 1986).

Department stores in this era developed a distinctive service-oriented business strategy. The goal was not simply to sell, but to sell in volume and cultivate a loyal customer base. Early

department store owners like Rowland Macy realized that increasing merchandise turnover, i.e., the ratio of items sold to inventory held over a given period, resulted in greater profits than trying to maximize the margin on each sale. By the early decades of the twentieth century, the focus of this strategy shifted from buying in volume and lowering prices to increasing the number of customers and the frequency and size of their purchases. Store managers deployed a panoply of tactics to this end: advertising heavily and offering regular promotions; investing in store architecture and amenities; and employing an army of clerks, assistants, porters, elevator operators, delivery workers, restaurant workers, and other service workers to attend to almost every need or whim of customers. Within each department, buyers retained considerable autonomy over merchandise and certain operations, though central management was represented throughout the store by "floorwalkers" who supervised frontline workers and responded to special customer inquiries or complaints (Benson 1986).

In 1900, retail clerks were overwhelmingly men. At a time when domestic work was seen as the primary if not sole responsibility of women, men were more likely to receive an education and thus have the requisite literacy for retail work. However, male retail clerks expressed a different kind of masculinity from that of their fathers and country brethren. Retail work was associated with the cultural figure of the "dandy," a man of refined tastes and ostentatious dress, freed from the strictures of traditional norms. Dandified clerks took advantage of their relative independence as wage workers in the city to indulge in the pleasures and vices of "the sporting life"—clothes, booze, gambling, and sex (Luskey 2010).

Department stores were the first retail establishments to employ large numbers of women, especially young, unmarried "sales girls" (Benson 1986; Glazer 1993). At a time when shopkeepers and specialty retail clerks were still mostly men, department stores such as Macy's and Wanamaker's

employed a considerable share of women. The pace and rationale of feminizing the sales force differed across stores and indeed across departments of the same store. Contemporaneous accounts suggest that managers preferred sales workers who mirrored the manners and sensibilities of the largely female clientele, particularly where the merchandise was tailored to women's bodies and tastes (Benson 1986, 23). Women sales clerks were also attractive to store managers because they could be paid less than men. A report from the Bureau of Labor Statistics' "Women in Industry" series recounts the gendered logic that justified this wage discrimination:

> There seemed a general recognition among managers that wages paid to beginners and sometimes to experienced saleswomen were not sufficient for a girl to live on honestly, but even more generally they either required their employees to live at home or gave preference to applicants who claimed to do so. In other words, they apparently preferred that girls should be subsidized by their own families. (1915, 224)

Of course, it was not enough for managers to change their hiring practices; women also needed to seek out retail work for their share of the workforce to increase. Prior to World War II, women's labor force participation was mostly limited to an age-specific period before marriage and, for some, later intermittent periods of widowhood or separation (Kessler-Harris 1982). Table D1 shows the number and percentage of women in customer-facing retail jobs over the course of the twentieth century.[8] While there was a rapid increase in women's employment in retail in the first half of the century, it is not until 1960 that women reach—and in fact exceed—the number of men in sales and cashier jobs.

Retail clerks occupied a more ambiguous class position than factory workers in the industrializing US. Retail clerks typically worked long hours for low pay with meager breaks or other accommodations. Nonetheless, retail sales compared favorably to other occupations open to

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[8] See Appendix D for all tables and figures referenced in this chapter.

workers who could read and write but did not have a specialized craft or professional training. Retail work was cleaner, safer, and less strenuous than working in a factory, mine, or farm (Bjelopera 2005). Especially in more upscale department stores, retail clerks were expected to dress and comport themselves like the genteel classes to whom they catered (Benson 1986). But the very public and luxurious nature of these stores made the meager pay and poor working conditions of the clerks all the more outrageous.

When sociologist Annie MacLean published an expose on her two weeks working in department stores in 1899, she denounced the long hours, meager pay, and unhealthful work environment as "inhuman and demoralizing," calling not only for "legislation and faithful inspection" but also "ameliorative movement on the part of consumers" to only patronize stores that adhered to the principles of the Consumers' League. These standards included a regular workweek of not more than 55-and-a-half hours (8 AM–6 PM six days a week with at least three-quarters of an hour for lunch) with Saturday half-holidays for at least two months of the summer (MacLean 1899, 740).

Beyond their sheer length, working days in retail routinely extended late into the evening if there were still customers to serve or other tasks to perform. Retail clerks were expected to remain at work until a supervisor dismissed them, not necessarily at an appointed end time. Thus the burden of long hours was made all the more onerous by unpredictable demands to work late. This practice was not only exhausting, but also unsociable, preventing workers from having dinner at a regular hour and obliging them to share the streets with unseemly downtown nightlife. An 1890 report of the New York Working-Women's Society to the "Convention of Working-Girls' Clubs" called attention to "conditions which tend to injure both physically and morally," in particular the practice of "large retail houses" requiring unscheduled overtime with no additional pay:

> The general idea is that saleswomen are employed from eight A.M. to six P.M., but they are really engaged in the majority of stores for such a time as the firm requires them; which means in the Grand Street stores, until ten, eleven, and twelve o'clock on Saturday night *all the year round*, the Saturday half-holiday not being observed in summer; and in the majority of houses that stock must be arranged after six P.M., the time varying, according to season, from fifteen minutes to five hours, *and this without supper or extra pay*; thus compelling women and children to go long distances late at night, and rendering them liable to insult and immoral influences. (Campbell 1893, 258, italics in original)

Long hours and progressive reform

Long hours were a source of exhaustion and discontent, but also a rallying point for workers to see their personal troubles as a symptom of a broader social ill. The situation of retail workers was distinct from production workers in that their hours of work were seen as tied to the hours of operation of the store, and thus the hours during which customers could do their shopping. However, retail workers could still recognize the short hours movement and protective legislation as something they had a stake in.

Frances Donovan, a sociologist of work trained in the Chicago School, recounts her own experience of strain and solidarity working in a department store over the summer of 1924. Donovan was working as a saleslady in the dress department of "McElroy's" (actually Saks Fifth Avenue) where the typical workweek was forty-four hours (1929, 83). At the end of July, Donovan was required, as were all store employees, to work mandatory overtime to do inventory. This semi-annual operation, still common in retail stores, involves a thorough review of all the stock in order to reconcile it against shipments and sales and identify any damaged or missing items. Although it did not seem to be a difficult task, Donovan was already fatigued from an unusually busy afternoon shift and the "terrific heat" further sapped her energy and attention. By the time she and her partner completed the racks assigned to them, she was "sure neither of us had ever been so hot or so tired" (73). As she waited for her work to be reviewed and her coworkers to finish, she supposed that "like

myself, they felt that the hated inventory and even institutions like department stores should be eliminated from a well-ordered world" (74). But her reverie was interrupted by the manager, who excoriated her in front of the others for missing twenty-six dresses on the last (extra) rack she inventoried. Donovan, who took pride in her selling prowess, felt "chagrined, ashamed, hurt" by this harsh assessment of her inventory work. Yet her coworkers came to comfort her. It is at this moment that one of them identified long work hours as the source of the problem and protective legislation as the imminent solution:

> "We ought not to work such long hours even if it is only twice a year," said Miss Lovelace. "My son says it won't be long now before women will not be allowed to work more than five hours a day. There has been a law passed to that effect in some states already and there'll be one, too, in New York one of these days. I believe the stores are getting ready for it now; that's why they are hiring so many part-timers. We'll all be on five-hour shifts in a few more years." (Donovan 1929, 79)

Note that the worker already identified part-time workers as the firm's strategic response to short hours legislation. Donovan closes this chapter with an observation about class consciousness: "It is in such ways and under such conditions that the 'salesladies' become class-conscious and tend to cast in their lot with the rest of the world that labors" (79).

Prior to the New Deal Era, conservative courts struck down all manner of labor legislation thought to infringe on the "freedom of contract" (Mettler 1998). However, paternalistic attitudes toward "the weaker sex" allowed for more targeted legislation establishing labor standards for women workers only (Clemens 1997).

Contingent scheduling and extra workers

Although the problem of long hours is the most widely discussed and documented issue related to the scheduling of retail labor, occasional government studies reveal instability in hours and employment concentrated on a secondary segment of the female labor force. An anonymous 1916

116

report issued by the BLS highlights the situation of "extra" or "contingent" workers, who "hold positions differing wholly from those held by the regular employees as to wages and unemployment" (7). This contingent force served to adjust staffing levels to match the "considerable ebb and flow in the tide of retail-store business" in particular departments or establishments, not only during holiday rush periods and seasonal transitions, but also around special sales, promotions, and on evenings with extended operating hours (BLS 1916, 6). The report observed that different stores and markets had various arrangements for retaining and deploying contingent workers—for example, as a permanent "mobile force" or seasonal "extras," working on demand or according to a definite schedule. In Boston, the retail labor force was segmented into regular employees whose hours were stable, with the exception of holiday peaks and summer lulls, and a "reserve labor force" of extras, "which can be drawn on by all stores for special service, because all the establishments together appear to offer opportunity for considerable employment, though the duration of service in any one may be exceedingly limited" (7).

BLS researchers noted that contingent workers alternating or moving between stores made turnover appear much higher at the establishment level than it was for the labor force in the aggregate. These extras are "nearly as numerous as the regular employees," although they differed in their life situations and schedule preferences:

> The majority of the women personally interviewed who served only as extras in the stores during the period covered by this study were not normal wage-earning women. They were schoolgirls working Saturdays or during vacations, married women not dependent upon their earnings, or single women whose other means of income were such that they did not need or desire regular work. There were also a considerable number who were seeking to secure a foothold as regulars in the stores. (BLS 1916, 7–8)

The report suggested that the primary difference between the regular and contingent segments of the labor force was how dependent they were on their own earnings as opposed to income from

family members or other sources. Whereas 40 percent of women working as regulars reported that they contributed at least a quarter of family income and another 45 percent said their "standard of living would be lowered if they did not contribute," among women working as extras, less than 3 percent contributed a quarter of family income and only 35 percent said the family's standard of living depended on the woman's earnings (pp. 34, 65). This difference in familial dependence is reflected also in the rate of pay, with extras earning 20 percent less on average than regular employees per day of work.

It is important to view these practices in relation to other jobs that were available to retail workers. In comparison with many goods-producing industries, retail appears to have *less* seasonal volatility and involuntary hours reductions and layoffs (BLS 1916). This is particularly the case in the few industries such as canning and box-making that employed substantial numbers of women in the early twentieth century (BLS 1915). In comparison with other service industries, retail exhibits an intermediate degree of volatility. According to a series of studies conducted by the Women's Bureau, hours of work in department stores were more regular than in restaurants and laundries, but the level of employment for retail salespersons was more volatile than for telephone operators (Pidgeon 1930, 1933). During the Great Depression, retail employment did not fall by as much as in the manufacturing sector, but there is some evidence of intensified volatility, particularly for women working in department stores (see figure D2).

An important factor in the changing status of retail work in the mid-century United States is the growing albeit uneven unionization of the retail industry (Harrington 1962). Spurred by New Deal reforms and more militant leadership, retail workers in department and chain stores organized to establish unions and contracts providing better pay and working conditions. However, union contracts in retail typically excluded seasonal workers and often allowed for part-time workers to

receive lower compensation than regular full-timers (Kirstein 1950; O'Brady 2019). High turnover in downscale stores made unionization more difficult than in upscale stores:

> Downscale store managers' employment practices doomed most unionization campaigns to failure at these stores … downscale store managers employed large numbers of unskilled workers for relatively short periods of time… At Alexander's, Klein's, Ohrbach's, May's, and other downscale stores throughout the city, only a small minority of workers had any intention of making their job in the store a lifelong commitment. Working in these stores was a job to be taken for only a short time before moving on, either to a better job or, for some of the women workers, to marriage. For those workers in downscale stores who were looking for a more permanent position in retailing, there were jobs which offered better wages, with or without unions, in upscale stores. (Opler 2007, 96–7)

Retail unions had greater success when supported by a broader coalition of labor, liberal, and radical organizations. In New York City, communist organizers and sympathizers played a crucial role in mobilizing and coordinating strikes, protests, and other actions on behalf of retail workers. Historian Daniel Opler argues that part of what enabled the New York City retail unions to attract and sustain support from workers and the public was the way they framed their struggle as one of "white collar workers" (2007, 6). This frame simultaneously identified retail workers as part of the working class and as practitioners of a nonmanual occupation akin to professional and technical occupations.

Self-Service Stores in Midcentury

The retail sector underwent major transformations during World War II and the ensuing decades. In terms of the composition and work hours of the retail labor force, the transformations that occurred in the immediate postwar decades were as rapid and arguably as consequential as those that followed the neoliberal turn of the 1980s. This is when women became a majority not only in specific segments, but in the retail workforce overall (see table D1 in appendix). Not coincidentally, it is also when part-time work spread from a subset of retail jobs to the typical entry-level

arrangement. These changes coincide with a shift in business strategy from the service-oriented model of urban department stores to a self-service model associated with suburban branch and discount stores.

Perhaps the most profound change in retail sales around midcentury was the spread of self-service, what sociologist Nona Glazer (1993) calls the "work transfer" from retail employees to customers. Traditional shops and early department stores kept merchandise secured behind service counters, amassed in unwieldly bins and piles, stashed in unmarked drawers and cabinets, or artfully displayed for customers to see but not touch. In addition to processing transactions, a primary responsibility of sales workers was to retrieve and present products for customers' consideration (Benson 1986). Handling or trying on of merchandise was restricted both to protect it and to limit the time that clerks might spend facilitating or rearranging after idle browsing. This model made a certain amount of sense for delicate or expensive items, but it became a greater hindrance in the tight labor market of the 1940s and 1950s. Shifting to a self-service model, where customers could peruse and select goods from racks or shelves, allowed retailers to reduce their labor input and concentrate it on more routinized tasks such as stocking and checkout.

In what is a recurrent pattern in the history of US retail, innovations in the business model were developed by discount stores on the periphery and then later adopted by established firms in response to changing market conditions. The originator of the self-service format was the Piggly Wiggly grocery chain, which opened its first store in Memphis, Tennessee in 1916 (Glazer 1993). The store found immediate success as customers selected more goods from open shelves than they requested from clerks at traditional grocers. The increased volume of sales more than made up for stolen or damaged goods. However, the success and spread of chain stores such as Piggly Wiggly

and A&P was contested by small, independent retailers and populist politicians, especially during the 1930s (Ingram and Rao 2004).

The shift toward self-service is part of a restructuring of risk governance on all sides of the retail sector, between buyers and sellers, commercial developers and operators, merchants and consumers, employers and employees. For consumers, trading more of their own time shopping for more standardized goods sold at lower prices was an attractive value proposition. For manufacturers, selling larger quantities of packaged or branded goods to self-service retailers at first allowed them to better access consumers and improve marketing, although over time retail competition and consolidation placed downward pressure on manufacturer prices. This dynamic accelerated after the 1975 repeal of so-called "fair trade" laws, Depression-era measures that required retailers to adhere to prices set by manufacturers (Bluestone et al. 1981; Lichtenstein 2009). For workers, the most dramatic change associated with this period of restructuring in the retail sector was the rise of part-time hours and nonstandard timing.

Rise of part-time work

The clearest historical trend in working time in the retail sector is the rise of part-time work among salespersons and cashiers. Table D4 uses data from the Decennial Census and American Community Survey to estimate the distribution of work hours. It shows a shift toward shorter hours, with average work hours decreasing from more than forty-six in 1940 to fewer than thirty-four in 2018. Meanwhile, the share of workers with part-time hours, conventionally defined as fewer than thirty-five hours per week, increased from 10 percent in 1940 to 45 percent in 2018. While we lack systematic data on work hours in retail prior to 1940, some studies suggest that there was a similar trend toward shorter hours from 1900 to 1930, marked more by a reduction in very long hours than an increase in part-time hours (Hunnicutt 1988; Roediger and Foner 1989).

The most substantial increase in part-time work seems to occur from 1950 to 1980, with the number of salespersons and cashiers working fewer than thirty-five hours surging by more than 4.5 million, an increase of 173 percent. This increase is related to a shift in the gender composition of retail salespersons and cashiers from 34 percent women in 1930 to 61 percent in 1970.

Although some sociologists treat part-time work as inherently substandard, here again it is necessary to assess job quality and stability relative to workers' expectations. The majority of part-time workers do not want full-time hours. When prompted by researchers, workers give a variety of reasons for this preference, including needing time to care for family, attend school, remain partially retired, or do whatever else they value more than working thirty-five or forty hours per week. The Bureau of Labor Statistics distinguishes between "economic" reasons, such as slack business conditions or inability to find full-time work, and "non-economic" reasons that include everything else, whether personal preferences or extraordinary circumstances. Figure D3 plots the share of employees reporting economic reasons for working part-time in the previous week (red line) as well as the percentage who usually work part-time for non-economic reasons (blue line), going back to 1955 when the BLS began to systematically collect these data. There is a clear cyclical pattern in part-time work for economic reasons, which rises sharply during recessions (shaded areas), peaks near 6 percent, then gradually declines, much like the unemployment rate. By contrast, part-time work for non-economic reasons shows a secular increase from less than 9 percent in 1955 to 13 percent in the 1970s, at which point it levels off. The discontinuity in 1994 reflects a change in the wording of the Current Population Survey that resulted in more workers being classified as "non-economic" and fewer as "economic" part-time workers.

Feminization and casualization of the retail labor force

An important supply-side factor in the growth of part-time retail work is increasing college attendance, particularly for women in the postwar decades. While only 2 percent of retail workers were enrolled in school or college in 1940, this increased fivefold to 11 percent in 1950, and continued to rise through 2000, when it peaked at 28 percent (see table D2). Meanwhile, the share of college students enrolled on a part-time basis increased from less than a third to more than half over the same period (O'Toole et al. 2003).

The rise of part-time work is also linked to the extension of store opening hours. Some department stores had experimented with staying open until 8 or 9 PM on one or two evenings a week, but reversed course during the Depression. With the economic boom and the development of suburban shopping centers following World War II, large retailers extended hours of operation to lure more consumers and encourage shoppers to linger. Evening and Sunday hours were more convenient particularly for customers with full-time jobs and increasingly long commutes. Although women continued to do most of the household shopping, men took part in a growing share of shopping trips, and since they were typically the primary if not sole breadwinner, husbands could be decisive in major purchases, for instance, of household appliances (Cohen 2003). Suburban retailers appealed to familial and civic values in their marketing and the wide array of leisure and community activities hosted at malls. Coupled with the more accommodating business environment of the suburbs, these symbolic appeals helped retailers overcome traditional legal and moral prohibitions on Sunday commerce.

Extended operating hours were accompanied by more part-time workers, not only because of an increased supply of married women and students seeking part-time work, but also because they allowed managers to better match the service level to customer demand (Carré and Tilly 2017).

The experience with shorter hours during the Depression helped many employers, including retailers, recognize the deleterious effects of long shifts on employee performance. Although most retail workers were covered by the FLSA only through amendments passed in the 1960s (Mettler 1998), the forty-hour standard for full-time work was already being observed in many stores. Thus extending operating hours typically meant increasing the size of the workforce in the store. If more full-time workers were added, they would need to work shifts that alternated or overlapped near the middle of the day. By contrast, part-time workers can be scheduled for shorter shifts to provide additional staffing at busy times of the day or week. This use of regular part-time workers to achieve different staffing levels over the course of the week is a logical extension of the use of part-time "extras" during the holiday season.

In addition to these labor supply and staffing considerations, retailers sought to increase the share of part-time workers as a way of reducing unit labor costs. Part-time workers typically receive lower hourly wages and fewer benefits in retail as in other sectors of the US labor market (Carré and Tilly 2017; Tilly 1996). This compensation penalty is compounded by the greater likelihood of part-timers working at nonstandard times (Presser 2003). Premium pay for evening, night, or weekend work was and remains rare in retail outside of the unionized grocery segment (O'Brady 2019). However, it should be clear from the preceding discussion that labor costs were not the only driver of the rise of part-time retail work. The share of all retail workers reporting more than forty hours of work per week fell rapidly from 1940 to 1960, though only a fraction of this workforce was entitled to an overtime premium (Mettler 1998).

Internal flexibility and dualization

As part-time work spreads to more stores and positions, leading retailers develop more variegated staffing and scheduling systems designed not only to provide an expected level of regular

and seasonal coverage, but also to allow managers to adjust staffing levels in response to unexpected

events. Although these systems still assume a norm of regular, full-time schedules for the core

workforce, they distinguish between multiple types of secondary or contingent workers. Helen

Hyde, Manager of Welfare and Employee Services, described the elaborate staffing system at Macy's

in New York City in 1954, when she addressed a meeting of the National Retail Merchants

Association (NRMA):

> It seems to me, in talking of internal recruiting, that the first thing you ought to determine is whether you have enough shock troops. You may not call them that; I call them shock troops because it relieves the shock on the employment office if you have good flexibility in your own organization.

> Some of you have people on call; some of you have part-timers you can use for overtime or for more than 28 or 30 hours a week. The internal machinery should, in my opinion, include a good contingent force to take care of absenteeism, a good flying squad or whatever you want to call it to take care of emergency situations, and a workable flexibility program from non-selling to selling and from selling to non-selling.

> Our flying squad at Macy's has been in existence for 15 years, and we are very proud of it. At the present time we have 200 on the flying squad, and because it is in the fourth wage bracket—from a job evaluation point of view—we can promote from the first three brackets. We have a long waiting list for the flying squad; we have no difficulty in filling the jobs, and so far we have been able to insist on two years of experience and excellent ratings. I don't believe that we will ever have to lower our standards.

> The flying squad is made up mainly of full-timers, but because of our night operations we have people who work six hours on Saturday, four hours on Monday and Thursday; others who work eight hours on Saturday and four hours on Monday and Thursday; and still others who work three full days a week. We have part-timers working 28 hours a week, five days, and the regular 40-hour full-timers. (NRMA 1954, 8)

I have quoted this passage at length because it reveals a well-developed set of practices

designed to provide internal flexibility through contingent staffing and scheduling. These practices

are all the more remarkable because they were in use at one of the preeminent union shops among

the New York department stores. By 1954, New York City retail unions were losing member density

in the region and suffering deteriorating conditions even in downtown shops (Opler 2007). But Hyde claims the "flying squad" of contingent workers was already in existence in 1939, when the Macy's local was, if not at their peak, then still formidable as a countervailing force to managerial control (Kirstein 1950). It is difficult to say how widespread these practices were beyond Macy's or other department stores active in the NRMA. However, it is clear that they long predate the neoliberal turn of the late twentieth century and, at least in the case of Macy's flagship store, developed in spite of a relatively strong local union.

Lean Retailing in the Late Twentieth Century

The host of discount chains found in the early 1960s—Target, Walmart, and Kmart— became dominant in the 1980s and 1990s. While these chains participated in the broader postwar trend toward more casual, self-service stores, their most important innovations occurred further up the supply chain, before the products reached their stores.

"Lean retailing" is a term that industry analysts use to refer to the business strategy that, with some notable exceptions, has come to dominate the US retail sector (Abernathy et al. 1999; Fisher and Raman 2010). Its characteristic feature is active management of market risk through the collection of real-time information and the continuous adjustment of operations. The "leanness" of this strategy describes the reduction of cost that results, for example, from rapid turnover and replenishment of merchandise in lieu of large, slow-moving inventories. The cost savings realized through lean retailing allow firms either to reduce prices or invest in information and logistics systems that generate further efficiencies. While price competition and rapid turnover are familiar tactics in discount retailing, the use of information and logistics to increase the scale and speed of operations is a more recent innovation. In the US context, lean retailing is most closely associated with Walmart, whose massive scale and success are due in no small part to its pioneering

126

applications of digital technology and centralized distribution networks (Lichtenstein 2009). Yet in recent decades, most large retailers in the US have adopted a similar strategy or else ceded market share to "leaner," lower price competitors (Carré and Tilly 2017; Hortaçsu and Syverson 2015).

Walmart led the shift in competitive strategy toward efficient distribution as a core component of discount retailing. While all discounters pursue some sort of high volume, low margin strategy, Walmart broadened the strategy beyond merchandising to reduce costs at every step of the supply chain. The focus of early discounters on inventory turnover thus becomes generalized to a strategy of increasing *resource velocity*, or the speed with which products and other inputs generate value through new sales.

Lean retailing capitalizes on a series of technological innovations, the most important of which are barcodes, containerization, and computerized information and communications systems. These technologies originated in the postwar decades, but only achieved widespread adoption in the late twentieth century as Walmart and other discount chains restructured their operations to realize their potential (Lichtenstein 2009).

Digital technologies were introduced at multiple points of the distribution chain. Perhaps the most consequential sector-wide change is containerization, which facilitates faster and cheaper shipping of goods throughout increasingly global supply chains (Levinson 2006). Within retail stores, the labor process changed significantly after introduction of bar codes for identifying merchandise and electronic scanning devices at the point of sale (Abernathy et al. 1999).

Diversification of retail labor force

If midcentury was the period when the gender composition of retail workers flipped, the last decades of the twentieth century were marked by change in the racial and ethnic composition of the retail labor force. Historical sources identify a select few stores and jobs open to Black workers in

early department and grocery stores, typically in non-selling roles such as porters, elevator operators, and meat-cutters (Franklin 1936; Glazer 1993). Prior to 1970, Black, Hispanic, and Asian workers together comprised fewer than 5 percent of retail salespersons and cashiers. By 2000, these groups are represented among the retail sales force roughly in proportion to their share of the working-age [16–65] population.[9]

The growing diversity of the retail labor force is, to some extent, a legacy of the Civil Rights struggles against discrimination in public accommodations. While the most celebrated examples of integration campaigns in retail are the lunch counter sit-ins associated with five-and-dime stores in the South, integration of retail spaces for Black customers created an opening and eventually a business rationale for integrating the workforce (Cohen 2003).

As the retail labor force became more diverse, so too did retail workers' expectations and attitudes toward their jobs. Retail employers, already moving away from rigidly segmented employment models, seized upon this diversity as a further rationale for casualization and routinization of retail jobs.

Nonwork commitments and reasons for part-time work

We gain a more detailed picture of the reasons for part-time work in retail sales for much of this period by combining information from CPS questions on usual hours, hours last week, weeks of part-time work last year, and various reasons for these arrangements. Table D10 summarizes this information by first categorizing workers according to whether they usually work at least thirty-five hours per week or less and then, within these categories, what reason they give for working part-

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[9] As with occupational categories, Census classifications of race and ethnicity change over time, complicating historical comparisons. However, the basic trajectory of sharp increase in the late twentieth century from a very low base is corroborated by contemporary accounts and more detailed histories (Bloom et al. 1972; Glazer 1993; Opler 2007).

time weeks, if any. I disaggregate economic and non-economic reasons for part-time work into six types: those related to the nature of the job (e.g., seasonal work, inability to find full-time work, start or termination of the job in the week); those due to broader business conditions (slack work, material shortages, repairs to plant or equipment); those related to health and family (including child care and limitations due to one's own illness); demands of school or training; personal preference (no desire for full-time work); and a residual category of other reasons (weather, vacation, labor disputes). Where workers' hours and reasons are not explicitly recorded, I rely on the harmonized IPUMS classification of work status to allocate workers to the consistent full-time, full-time with part-time weeks for economic reasons, part-time due to business reasons, or part-time for other reasons column. This coding strategy inflates the numbers in the first and last two columns, particularly for the period before 1994 when usual hours and a more detailed set of response options were incorporated in the core questions of the CPS. Earlier classifications of the reasons for part-time work lumped together "housekeeping" and "school" under a generic "too busy" with other obligations option that I allocate to the residual "other reasons" column.

Despite the limitations of these data, they reveal several interesting aspects about retail workers' understanding of their work situation. First, consistent full-time work is less prevalent than it appears if we look at usual hours or hours worked in the past week in isolation. Second, school or training is the modal reason given for part-time work, representing 16 percent of retail salespersons and cashiers in the early 2000s and 38 percent of those who usually work part time. However, given that more than a quarter of retail workers attend school or college in recent decades (see table D2), this figure suggests many students do not see this as the primary reason for their part-time status.

Changing consumer culture

As discount retailers subject firms in other segments to fierce price competition, some chains turn to service as a means of luring and retaining customers. However, there is a tension between raising customer service expectations and attempting to match discount prices. Retail employers, reluctant to invest in training and retention, instead try to recruit and screen for customer service skills as part of the hiring process (Moss and Tilly 2001; Williams and Connell 2010).

Retail workers' earnings represent a considerable share of the income of their households (see table D7). The growing economic dependence of retail workers on their earnings has been accompanied by an erosion in their buying power as average retail wages (in 2014 dollars) fell from $20 in 1972 to less than $15 in 2014 (Carré and Tilly 2017, 19). This fall in real wages is exacerbated by hours of work that are fewer in number and less predictable for many retail workers. Thus, retail workers bring home lower and less stable earnings just as their households become more dependent on these earnings.

Contested diffusion of lean labor practices

It is important to recognize that the trends in retail service models I outline in this chapter did not seem obvious or inevitable even to senior managers in the industry. A human resources director interviewed in the late 1990s as part of the Multi-City Study of Urban Inequality placed his firm in relation to alternating phases of retail history, but greatly misjudged the future trajectory:

> The way that retailing was run in the thirties and maybe forties, you had counters and you had associates, like, every three feet of those counters. Then either in the fifties or certainly in the sixties and seventies there was a move away from higher staffing levels to lower staffing levels and more clerking as opposed to selling. What we were trying to do in the mid-eighties was to make a mark and a niche for ourselves in the market by running counter to that trend. And I think that [counter]trend continues for our organization. From what I read about what's going on in the industry as a whole, there continues to be a trend toward more service. (Moss and Tilly 2001, 69–70)

With the benefit of a few more decades, we can see that the trend toward self-service has if anything intensified. As discount chains expand in new geographic and product markets, they come into competition not only with department stores, but also specialty retailers. Even retailers that cultivate a high-service niche, such as the luxury apparel brand Barneys of New York, lose market share and in some cases go bankrupt under pressure from discounters. Many incumbent retailers respond by imitating the lean retailing and cost-cutting labor practices of their insurgent competitors. In this way, part-time hours and unstable schedules diffuse from mass market to upscale and specialty retailers.

Pressure from discounters leads some retailers to mount aggressive campaigns to extract concessions on wages, benefits, and scheduling protections from unionized workers. One of the most dramatic episodes of this type comes in 2003–2004, when UFCW grocery workers waged a defensive strike against supermarket chains in Southern California (Lichtenstein 2009). However, it was more common for unions to quietly negotiate "two-tier" contracts that maintained or modestly adjusted compensation for more senior, full-time workers in exchange for more substantial concessions on the part of more recently hired or part-time workers (Block et al. 2006).

Outside of the small unionized segment of retail, there is little evidence of organized resistance to job restructuring or schedule degradation in this period. The hostility of the Reagan and Bush administrations to organized labor may have contributed to this relative quiescence. However, a more proximate explanation is that retailers could use the high turnover and changing composition of the retail labor force to gradually replace stable full-time jobs with more unstable part-time jobs. A store manager at Gap, interviewed as part of the Stable Scheduling Study (described further in the next chapter), reflects on how full-time sales jobs were shed through attrition at this specialty apparel firm:

I liked it better back in the day where based on your volume you were allowed a certain amount of full-time positions. I liked it better because you could always count on those workers to know what they were doing and be available and dedicated to the job. You can build stability and more consistent sales with full-time workers who get to know the store's product over time and can answer customer's questions like "Do you have something like that one sweater you used to carry?" Full-time staff members are also more mature, more willing, and more invested. The company got away from the full-time sales associate positions it used to have. They were typically older women who had been here forever, and when they left, we didn't fill the full-time positions they left. […]

We lost the personal approach and culture we used to have. When you would see your regular customers, you would run to talk to them. This older lady who worked in the burbs, she knew everything about her customers' families. We've lost that culture, and it started when we lost our full-time sales associates on the sales floor.

E-Commerce and Precarious Scheduling in the Early Twenty-first Century

With the benefit of a longer historical perspective, we see that many features associated with poor job quality in contemporary retail jobs stem from changes well underway by midcentury, and in some cases, already evident in the early twentieth century. Although some segments of the retail labor force approximated the postwar standard of stable, full-time, unionized employment, this standard was never as widespread or as secure in retail as in some production industries (Ikeler 2016; Opler 2007). Rather than a discrete break with the postwar norm, the insecurity of retail labor emerges through the spread and intensification of practices once limited to discount retailers and contingent workers. The degradation of retail work coincides with changes in the composition of the retail workforce, which aggravate the insecurity experienced by a growing contingent of retail workers.

Retail employers have become more uniform in terms of what they offer at the same time that retail workers have become more varied in what they expect of their jobs. This mismatch is experienced by some workers as chronic disappointment, frustration, and insecurity that eludes their

comprehension or control. It is this experience, not the mere fact of poor job quality or instability, that I conceptualize as precarity.

Sociologist Christine Williams provides a vivid illustration of frustrated expectations in her story of Michelle, a 33-year-old Black woman who worked with Williams at a corporate toy store. Michelle took this retail job to supplement her work as a school janitor, which limited her availability but did not prevent the store manager from asking her to stay on during the school year and later promoting her to the service desk. Michelle was promised a wage of $10 per hour and a schedule that worked with her other job. In reality, she was paid only $9.25 to start and was disciplined for showing up late to a shift scheduled to begin an hour and a half before she got off work at her other job. Michelle complained to store managers and later tried (unsuccessfully) to get coworkers to sign a petition objecting to their diminished hours following a wave of new hires. Michelle had worked in retail previously at Kmart, but still found her experience at Toy Warehouse frustrating. Eventually these frustrations led her to resign (Williams 2006, 75–77).

Precarious scheduling

The rise of precarious scheduling is associated with increasing digitization of retail operations and the use of algorithmic management. Computer algorithms have become widely used by retail managers to forecast demand, set sales targets, track staff availability, and schedule shifts accordingly. In some cases, an integrated software package is used for all the manager's staffing and scheduling needs. In others, a combination of different applications or digital and analog tools serves to accomplish different tasks.

It is important to distinguish between the technology and functions of the scheduling process. Some commentators presume that use of computer algorithms implies "optimization" of labor input or maximization of profits. However, the same technology can be put to different ends,

particularly where managers operate under multiple constraints and performance metrics (Rogers 2020). Organizational research reveals that even within the same firm, managers may favor different technologies and operational goals (Lambert and Henly 2012). Across many segments of the retail sector, however, there is a trend toward increasing centralization of operations and a *de-personalization* of control over scheduling. Frontline managers do not cede schedule control to workers, but to an increasingly opaque system of corporate control.

Schor challenges the notion of algorithmic management as a kind of "digitized Taylorism," instead emphasizing managers' "retreat from control" of the labor process (2020, 77). Schor has in mind labor platforms that supply a small share of the retail labor force, mainly limited to delivery services such as Instacart. Workers who supply labor via these platforms typically do enjoy discretion over when and how long they work. However, Schor and her collaborators observed that worker control over scheduling and other aspects of platform labor tends to be inversely related to how dependent they are on their earnings from this work (Cansoy et al. 2020). Workers with other, more secure sources of income can be more selective than those who can only eke out a living by putting in long hours and accepting any and all offers of work.

Scheduling research often distinguishes between employer-driven instability and employee-driven flexibility (Jacobs and Padavic 2015; McCrate 2012). Employee surveys suggest that most retail workers experience schedule instability as primarily employer-driven (Schneider and Harknett 2019). In Williams's account, "flexibility" is merely a euphemism for managerial discretion: "[E]mployees were often threatened that their hours would be cut if they were not 'flexible' in terms of their available hours and willingness to perform any job" (Williams 2006, 64). However, workers may experience instability and flexibility as distinct or interrelated aspects of their jobs.

Williams and Connell argued that unpredictable schedules serve to screen out workers who do not embody the desired aesthetic of upscale brands since "[o]nly those who can rely on other sources of economic support can afford to take these jobs" (2010, 361). This claim neglects the similarity between scheduling practices in upscale and mass market retailers (Carré and Tilly 2017; Ikeler 2016). However, there is merit to the broader idea that retail workers are more likely to tolerate unpredictable schedules and unreliable earnings if they consider their jobs to be a stopgap or stepping stone to something better.

Ikeler argued that young workers living with parents, a partner who also works, or receiving other support have lower expectations than workers who primarily depend on their retail job for income. He suggested that Target and discount retailers exploit this dualism to maintain a system of contingent control: "The degree to which employers can recruit secondary workers, therefore, increases their chances for successful team building through [Human Resource Management] and limits potential resistance" (2016, 146).

Whether workers experience unstable scheduling as precarious depends on what they expect of their jobs (Besen 2006). Precarity in this view is a contingent result, not a structural feature of retail jobs. Indeed, it is possible that targeted recruitment of middle-class and more affluent workers allows retailers to implement more unstable scheduling without necessarily increasing the precarity experienced by the workforce (Ikeler 2016; Williams and Connell 2010). Conversely, expectations on the part of some retail workers, particularly those with dependents or without a college education, to benefit from promised flexibility or career advancement may be frustrated by the increasingly narrow and uncertain scope of opportunity for accommodation or promotion.

Labor market trajectories and relative job quality

In addition to the qualitative evidence provided by interview and ethnographic research, we can gain a more systematic view of how workers experience the quality of retail jobs by examining survey data such as the Displaced Worker Supplement to the Current Population Survey. These data, collected semi-annually since the 1980s, ask a large national sample of workers about hours, pay, and benefits they received at the most recent job they left, whether voluntarily or not, within the past three years, as well as in their current job. By comparing changes for workers starting or stopping retail jobs with those changing other kinds of jobs, we see that entering retail carries considerable risk of downward mobility. Table D12 presents the rate of three forms of downward mobility (lower earnings, loss of health insurance, and loss of full-time hours for economic reasons) associated with three kinds of job changes: out of retail, into retail, and between two non-retail jobs.

A majority of workers starting retail jobs following a separation from a non-retail job receive lower earnings, and the likelihood of losing earnings while entering the retail sector has increased in recent decades. It grew from just over 51 percent of workers starting retail jobs in the late 1980s to more than 62 percent in the past decade of surveys. By contrast, only 2 in 5 workers leaving retail earned less in their next job, as did less than half of workers changing jobs outside of retail. Downward mobility is also evident in rates of lost health insurance and conversion from full- to part-time hours for economic reasons. About 18 percent of workers starting retail jobs in the past decade do not have employer-provided health insurance, although they did through their previous job. This is higher than the 11 percent of workers who lost health insurance when they left a retail sales or cashier job, but similar to the rate for job changes between non-retail jobs, 16.7 percent in recent surveys.

Transitions into retail jobs compare most unfavorably with respect to work hours. More than 1 in 10 workers starting retail jobs report part-time hours due to slack business or inability to find a full-time job, despite working full-time in their previous job. This is roughly twice the rate of involuntary loss of full-time hours associated with other job transitions. Unlike loss of earnings, however, rates of downward mobility in work hours have declined somewhat in recent decades, from 13 percent in the 1980s to 11 percent in the 2010s.

One would expect that declining pay and increasing schedule instability would result in low job commitment and rapid turnover. Indeed, chronic labor turnover is a common complaint of retail managers and union organizers alike (Reich and Bearman 2018). However, available evidence suggests stable if not increasing job tenure across the retail sector in recent decades. Table D9 presents statistics on current and expected additional years of tenure for retail salespersons and cashiers, using data from periodic supplements to the Current Population Survey. With the exception of the 1990s when data are scarce, the tenure distribution is quite stable, with the median worker reporting two years in their current job and half of workers staying in their jobs for six months and five years. Perhaps more surprising is the apparent increase in tenure expectations captured in recent rounds of the survey. The median retail worker expects to remain in their current job two more years as compared with only one year during the late 1990s.

Compared to the overall labor force, retail work appears casual and transient. Although we lack systematic data for earlier periods, it is clear that high turnover has long been a feature of the retail sales force (Bluestone et al. 1981). However, the composition and experiences of retail workers have changed more markedly.

Scheduling regulation

It is in this context of increasing diversity and precarity of the retail labor force that we observe new forms of contestation and regulation of scheduling practices. Labor unions and advocacy organizations have led campaigns to pressure large employers, such as Walmart and Victoria's Secret, to end on-call arrangements and provide more hours on a more consistent basis to hourly employees (Figart 2017). These campaigns have been bolstered by prominent media coverage of the plight of workers and their families subject to unmanageable scheduling demands (Fugiel and Lambert 2019). Government officials have codified new scheduling standards into legislation and administrative rules, mainly targeting large retail and fast-food chains. By the end of 2019, such "fair workweek" or "secure scheduling" standards had been enacted in San Francisco, Seattle, Oregon State, New York City, Philadelphia, and Chicago. Nearly all of these reform efforts cite scholarly research both to document the extent of scheduling problems and to lend legitimacy to the proposed remedies (Fugiel and Lambert 2019; Luce et al. 2014).

The principal actors and commentators characterize these investigative, advocacy, and regulatory efforts as a singular "movement for fair scheduling." To date, however, the coalition and campaigns for new scheduling standards seem to rely more on professional advocates and institutional channels than on the insurgent organizers and protest tactics associated with the social movements of the 1960s. In this way, contemporary scheduling standards recall the protective legislation of the Progressive Era. While rank-and-file workers provide a public face and personal narratives of the problem, the staff of service unions, advocacy organizations, legislators, and other policy professionals initiate, formulate, coordinate, and promote these reforms. In the terms of veteran labor organizer and sociologist Jane McAlevey (2016), the movement operates on a logic of "mobilizing" rather than "organizing" the workers subject to precarious scheduling. This approach

raises questions about how effective scheduling protections will be without broader awareness and participation of retail workers in the struggle for a fair workweek.

Discussion

This study has sought to refine sociological narratives about the precarization of retail work. The dominant narrative presumes structurally distinct labor market regimes that reflect different balances of class power. But rather than grounding this narrative in power relations specific to the retail sector, sociologists generally project onto retail the postwar standard employment relationship and subsequent neoliberal break observed in manufacturing or other sectors. This projection results in a distorted view of the transformation of retail work, especially with respect to working time and tenure. Contemporary practices of unstable scheduling and contingent employment do not result from a reversal of earlier trends, but rather from their intensification, spreading then to a broader segment of the retail labor force. The precarity that today seems so problematic in retail has antecedents before and during the supposedly stable postwar period.

In order to correct these distortions, I take a longer historical view that brings into focus both continuities and shifts in the US retail sector. I argue that the retail labor force has become precarious through a confluence of changes in business strategy, consumption patterns, and worker expectations. While the retail sector has long been heterogeneous, the assortment- and service-oriented model of traditional department stores has been supplanted over the past century by a logistics-focused lean retailing model in which labor input is subordinated to operational constraints. The success of this retail model depends on more opportunistic and cost-sensitive purchasing behavior on the part of consumers. As retail work was de-skilled and made accessory to customer self-service, retail workers faced dwindling opportunities for advancement, despite a growing contingent of prime-age and workers of color with fewer prospects outside the low-wage service

sector. The casualization of retail work was met with little resistance on the part of labor unions, who failed to extend their foothold beyond a segment of department and grocery stores that have steadily lost market share to large discount chains like Walmart and Dollar General (Hortaçsu and Syverson 2015).

Perhaps the most striking aspect of the change in working time of retail salespeople is the shift from long to short hours. In the early twentieth century, the typical schedule comprised ten-hour days, every day but Sunday. Most sales clerks worked the entirety of their store's opening hours, reinforcing the association between hours of work for the sales staff and hours of operation for the store. By the early twenty-first century, the average workweek in retail sales fell to thirty-four hours, with a substantial share of part-time workers averaging less than twenty hours (Carré and Tilly 2017). Store opening hours do not account for this decrease—if anything, stores stay open longer in the contemporary period where 24-hour operations have become more common. Instead, the size of the retail workforce has increased to cover weekly operations even while each worker spends fewer weekly hours in the store.

Changes in working time are intimately connected to changes in the staffing of retail stores. As retail employers shift from a smaller full-time workforce to a larger but more often part-time one, retail employee schedules become more heterogeneous and potentially unstable. Greater heterogeneity of work schedules is to some extent a necessary consequence of the shift to shorter workweeks. If store opening hours are constant, but the share of these hours that each employee works decreases, then the days and hours that employees work must become more dissimilar. We can conceptualize this development in terms of *fragmentation* of working time.

However, greater heterogeneity of work schedules also stems from increasing diversity of the retail labor force. While the retail sector employed both men and women from an early date, though

often in gender segregated jobs, the age and racial composition of sales clerks was relatively homogeneous before the middle of the twentieth century. Growing labor force participation of women, particularly married women and mothers, meant that women retail workers were less likely to be of the same age and life stage. The Civil Rights Movement fought to desegregate retail operations—most famously at lunchroom counters—and open jobs to Black workers, particularly in higher status sales and managerial occupations. As the composition of the retail workforce has become more diverse, so too have their expectations of their jobs.

While many commentators see low wages and unstable hours as major problems of contemporary retail jobs, there is less recognition of how changes in the composition and expectations of the retail force compound the problem. The key feature of precarity in my account is the growing mismatch between what workers expect of their jobs and what their employers offer. I seek to ground the evaluation of job quality in a more explicit study of workers' own values and judgments. This approach also responds to popular notions that employers hold about job quality as a matter of "fit" or match between the position and the worker.

The emphasis on employer power in much of the literature on precarious work tends to overshadow how concurrent changes in the labor force can render the same job more precarious because of the jobholder's situation. Recognizing the continuing favorable (or at least tolerable) experiences of many retail workers does not negate the real hardship and exasperation experienced by some. But if precarious work is to be more than a euphemism for "bad jobs," it should take into account the vulnerability of the worker to the risks presented by the work.

Contemporary retail jobs both offer and demand schedule flexibility. But the benefits and costs of this flexibility are unequally shared. Workers who are not dependent on their job can enjoy the flexibility to work on their own schedule and decline additional hours. But workers who cannot

afford to turn down hours must be available to work at their employer's discretion. Retail jobs typically involve minimal commitment to ongoing employment or performance improvement.

The alternative narrative I develop in this chapter has implications not only for how we understand the origins and beneficiaries of precarious schedules, but also the prospects for a reversal or change in direction of these trends. Just-in-time scheduling and the precarious schedules that it generates for many workers are not an inevitable feature of discount retailing or algorithmic management. These very same strategic and technological principles can be combined with quite different staffing and scheduling practices, as indeed is already evident at Amazon and other large e-commerce companies. Once the interactive service component is removed, or more accurately, performed in a remote, more or less temporally desynchronized manner, the need for simultaneous copresence of workers and customers is obviated. Fluctuations in customer demand can be smoothed through aggregation, queuing, and redirection across nodes in a distribution network. They no longer need to be absorbed immediately by individual stores. A sales associate overwhelmed by a rush of customers cannot reroute their business to another store with more capacity. Even patient customers will typically wait only several minutes and certainly no more than an hour before giving up on a purchase in a brick-and-mortar store. But the same customers will happily wait hours or days for an online transaction to be completed.

Beyond refining scholarly understanding of the origins of unpredictable schedules in retail, my study aims to reorient the sociology of work toward more explicit normative theorizing about job quality. Much recent sociological literature in this field is narrowly focused on comparative assessments of labor market "outcomes" such as hiring, earnings, promotion, and the formation of professional networks. The default normative orientation is toward exposing and reducing inequality, especially where it aligns with illegitimate bases of discrimination. But precarious work

142

would still be a problem even if it were proportionally distributed across the population. Retail work becomes precarious when it defies workers expectations to earn a decent wage, have a say in when and how they work, and enjoy the freedom to do what they will with their time outside of work. While retailers have long subjected at least a segment of their work force to similar conditions, the fact that these practices are now meeting with increasing contestation from workers and progressive reformers is reason enough to reevaluate them.

Chapter 4. Consistency and Productivity in the Retail Labor Process: Evidence from a Field Experiment

In the preceding chapter, I described the rise of discount retailing and the transformation of retail work over the course of the twentieth century. As retailing has shifted from a full-service to self-service format, retail workers have been relegated to an auxiliary role in selling. Retailers rely on marketing and promotions to sell merchandise; workers merely facilitate the sale by stocking and displaying merchandise, directing customers around the store, processing transactions, and perhaps fulfilling online "ship from store" orders (Carré and Tilly 2017). This transformation in the content of retail work clears the way for the fragmentation and destabilization of working time. As retailers consolidate around lean retailing and low prices, managers increasingly treat labor as a cost to be minimized (Fisher and Raman 2010).

Low wages are the most obvious means of containing labor costs, and the one that has received the most public scrutiny. But perhaps the more distinctive tool that US-based retailers have engineered to economize labor is just-in-time scheduling. Applying the principles and tools of lean retailing, particularly the use of centrally controlled algorithms to forecast and adjust inputs to meet demand, just-in-time scheduling is believed—both by promoters and detractors—to increase productivity by minimizing labor hours. There is little doubt that just-in-time scheduling constrains labor costs by imposing austere budget constraints on scheduled hours and facilitating rapid cuts or reallocation of hours in response to changing business conditions (Lambert 2008; Reich and Bearman 2018). However, its overall effects on labor productivity and business performance are less clear.

A growing body of research in retail operations highlights the detrimental effects of just-in-time scheduling and chronic understaffing (Kesavan and Mani 2015; Mani et al. 2015; Ton 2014). This research reveals that major retailers often set labor budgets too low, fail to maintain sufficient staffing levels to meet customer demand, and generate excessive inconsistency and unpredictability that undermine performance. These findings reinforce more wide-ranging critiques of "low-road" retailers like Walmart, often juxtaposed with "high-road" retailers like Costco (Lichtenstein 2009; Shell 2009). While low-road firms have lower marginal labor costs, poor job quality contributes to higher turnover and more operational problems than at high-road firms. Cross-national comparisons reveal considerable variation in labor practices of the same multinational firm in different institutional and market contexts, underscoring the idea that different business models can be viable even in mass market retail (Carré and Tilly 2017). But with so many differences between these cases, it can be difficult to identify specific mechanisms or causal effects.

In this chapter, I take advantage of a field experiment and rich organizational data to study the relationship between schedule consistency and store performance. This study directly evaluates the thesis that excessive instability undermines labor productivity. It also allows me to explore potential mediators of this effect through various forms of consistency, commitment, and coordination in the labor process. Whereas my previous chapters examined the origins and functions of unstable scheduling across many firms or industries, this chapter focuses on a single specialty retail firm in order to provide a more detailed view of the scheduling process and its effects.

The remainder of this chapter comprises seven sections. The first section situates the study in contemporary operations and sociological literature that recognizes both costs and benefits of just-in-time scheduling. The second section elaborates the theoretical links between consistency and productivity via individual skill formation and coworker coordination. I provide an overview of the

Stable Scheduling Study in the third section, followed by more detailed accounts of the methods used and results obtained from different kinds of data. The fourth section focuses on the qualitative evidence from manager interviews and employee survey comments. The fifth section lays out my quantitative measures and methodology for analyzing corporate administrative data. In the sixth section, I report the results of descriptive and regression analyses. The seventh section offers a more synthetic discussion of my results and the limitations of my study, which yields a more mixed picture than expected.

Just-in-Time Scheduling in Retail

Just-in-time scheduling is a common practice in retail and other industries that service or produce goods for a variable market demand (Lambert 2008; Reich and Bearman 2018; Schneider and Harknett 2019). The basic aim is to minimize labor costs while maintaining sufficient labor input to meet demand. In retail sales, a common strategy for achieving this goal is to set a productivity target of sales per labor hour, forecast sales based on historical and recent data, schedule workers accordingly, and then add or cut hours in response to deviations from forecasted sales in order to stay below the productivity target (Kesavan and Mani 2015). This strategy is often implemented using workforce management software that automates some aspects of the scheduling process. Such software may automatically forecast sales and set a labor budget based on predetermined parameters and historical data. Some software may even generate a default schedule that allocates budgeted hours over time and across workers while taking into account availability and other constraints (Henly and Lambert 2014).

Just-in-time scheduling may be understood as a form of algorithmic control over the scheduling process that cedes personal discretion to an impersonal set of rules and procedures (O'Neil 2016). Under algorithmic implementation of just-in-time scheduling, the "upstream" tasks

146

of forecasting, budgeting, and allocating labor hours are automated, allowing managers to concentrate on "downstream" tasks of adjustment. Managers have situational and relational knowledge that may make them better able to anticipate and respond to unusual events than even the most sophisticated algorithm. However, in the context of a lean retailing model with austere labor budgets, store managers often have more discretion to rearrange or cut labor hours than to increase them (Lambert 2008; Rosen 2006). This governance structure reinforces the psychology of loss aversion, motivating managers to implement just-in-time scheduling in ways that may systematically undershoot rather than exceed efficient staffing levels.

Prior literature on just-in-time scheduling can be divided into two groups. The first takes an operations or engineering approach to designing and evaluating scheduling systems. This literature is primarily oriented toward developing new algorithms, models, or other applications for managers or technical staff. The second line of research takes a more sociological approach to assessing the effects of just-in-time scheduling on workers and the people who depend on them. This literature is characterized by a critical orientation toward just-in-time scheduling as a problem for workers or an obstacle to broader social or political ends. Put more simply, the operations approach aims to refine just-in-time scheduling, while sociological studies seek to expose and mitigate its costs. This dichotomy is not specific to scheduling issues, but follows a long tradition of "managerial" versus "laborist" scholarship on the labor process (Burawoy 2008).

In the operations literature, research on just-in-time scheduling in retail draws on more developed bodies of work on scheduling in manufacturing, hospitals, and transportation. The details of the labor process differ across these sectors, but the scheduling process has common features that are amenable to similar technical solutions. Conventional models use linear programming to determine the optimal level of employment and hours that minimize labor costs for a certain level of

traffic or sales within a given planning interval (Kesavan and Mani 2015). More sophisticated models incorporate stochastic demand for labor and nonlinear cost functions, features that better approximate business conditions in retail, but also make for more complex decision rules. The more complex the algorithm, the more opaque the rationale behind the labor budget and other inputs into the scheduling process (O'Neil 2016). Recent research in retail operations shows how even sophisticated scheduling systems can generate inefficient results due to poor execution (e.g., "phantom stockouts" resulting from understaffing of receiving or stocking positions) and flawed assumptions (e.g., projecting forward sales depressed by prior understaffing) (Ton 2014; Mani et al. 2015).

In the sociological literature, just-in-time scheduling is sometimes conceptualized as a high-tech version of pre-Fordist managerial techniques, such as "digital Taylorism" and "flexible despotism" (Chesta 2021; Wood 2020). Digital surveillance, algorithmic management, and fragmentation of working time serve to intensify labor exploitation while obscuring managerial control. In the preceding chapters, I have considered two aspects of this structural narrative: the externalization of business risk and the consolidation of employer power. In this chapter, I focus on the organizational aspect of just-in-time scheduling as an iterative, de-personalized mode of decision-making. Managers who practice just-in-time scheduling may or may not see it as a strategy for disempowering or shifting risk onto workers, but they have an acute awareness of the rapid cadence and limited metrics of accountability that govern the process. Indeed, I will show that at least some managers view just-in-time scheduling as inconsiderate and counterproductive, echoing concerns of the hourly workers subject to it.

There is little prior research on schedule consistency, either in relation to just-in-time scheduling or more generally. Data limitations are the most obvious explanation for this neglect.

Consistency is a longitudinal concept that requires time series or panel data to properly assess. As I discuss below, consistency can be analyzed in terms of sequence similarity. But most prior studies of sequence similarity use cross-sectional data, such as time use surveys, to analyze similarity across individuals or groups.

A clarification on terminology is in order. I use the term "just-in-time scheduling" to refer to an ensemble of managerial practices often characterized by short notice, inconsistent hours or timing, and an iterative process of forecasting, tracking, and adjusting labor hours to meet changing business conditions. From the worker's perspective, just-in-time scheduling means unstable and potentially unpredictable schedules. However, the iterative nature of just-in-time scheduling distinguishes it from the broader set of contingent arrangements I call "work as an option" in chapter 2. I continue to use the language of optionality and instability to contrast with the commitment characteristic of stable schedules. But I focus in this chapter on just-in-time scheduling to connect this research with prior substantive literature and to highlight the agency of managers in the scheduling process.

Potential Benefits of Consistent Scheduling

The labor process unfolds moment to moment. But it involves materials, skills, and social relations that are the product of many previous moments. These inputs to the labor process encode the past into the potentialities of the present (Abbott 2016). Is merchandise properly priced and displayed? Is additional stock ready as needed? When a customer requests an item, does the worker know where to find it? Or if it is out of stock, can the worker suggest a good substitute? Can she count on a coworker to assist with a demanding customer or cover other tasks in the meantime? Do the workers trust their manager to let them take needed breaks or work longer to finish what they started? The answers to these questions depend not only on the individuals involved, but also on

149

prior experience and preparation in the store. In this way, the course and current of the labor process is shaped by the sediment of past labor. However immaterial or ephemeral service labor may appear, it depends upon an embodied and encoded substrate formed through more or less routine activities.

If we conceive of labor productivity as a ratio of output to input, we can distinguish between two basic types of production strategies. Productivity increases may be generated either through increasing output or reducing input. In the sociological literature, this distinction is often mapped onto a dualist view of the labor market as divided into high- and low-road firms or good and bad jobs (Appelbaum and Batt 1994; Kalleberg 2011). Low-road firms create bad jobs as part of a production strategy focused on reducing costs, whereas high-road firms invest in good jobs as part of a strategy to increase output or value added. However, this dualist notion presumes a degree of rationality and coherence that is rarely observed in practice, at least not among large, functionally differentiated firms. Some technical staff may be solely focused on reducing costs, but frontline managers typically are held accountable to multiple objectives, including both output and input metrics. The tension or incoherence between these objectives leaves room for manager discretion, which can be used in more or less productive ways (Lambert and Henly 2012).

In this chapter, I examine the productivity effects of managers implementing more or less consistent labor scheduling in a context of lean retailing. I identify two pathways through which greater consistency may promote higher productivity: (1) via more regular and sustained skill formation and (2) via closer and more effective coordination. I also consider potential complementarities between these forms of human and social capital in retail work. Finally, I qualify this argument by discussing the scope conditions for productivity gains to more consistency. I

suggest that heavy reliance on cost cutting and a lack of buffers against instability make just-in-time scheduling more likely to be implemented in counterproductive ways.

Schedule consistency promotes skill formation

I first consider how consistency may promote the skill formation of individual workers. The premise is that skills take time and effort to develop and maintain. Workers who perform a task with some regularity will become more skilled in doing so compared to those who perform the task only rarely. A skilled cashier, for example, will execute transactions more rapidly and with fewer errors than a customer using an unfamiliar self-checkout kiosk. Skill formation depends not only on how frequently workers perform a task but also how diligently. Workers who apply themselves to learning and mastering the task will outperform those who are indifferent or preoccupied with other matters.

I conceptualize skill formation as a process of investment in human capital, which has both objective and subjective aspects. Consistent work schedules create an objective basis for such investment by providing regular opportunities for developing job-specific skills. Consistent schedules may also promote feelings of commitment and belonging that are subjective markers of a worker's investment in their job. This is a corollary of my larger thesis about schedule stability as a form of mutual commitment to the employment relationship. The key concept here is *investment* in the double sense of subjective commitment and objective risk-taking. The propensity of employees to take risks with the expectation of future returns depends on whether and how they view their future with the employer (Becker 1964). Investing in job-specific skills is risky for workers, not only because these skills may not be "portable" to other jobs, but also because workers may not have sufficient opportunities or incentives to realize the returns of this investment within a given job.

151

I expect consistency to be particularly important to skill formation in retail sales, where the extent and intensity of work demands tend to vary with daily, weekly, seasonal, and other social rhythms. A retail worker may perform a quite different set of tasks on Wednesday mornings than on Saturday afternoons or when serving regular versus first-time customers (Grugulis and Bozkurt 2011; Ton 2014). Inconsistent schedules characterized by different shifts from week to week deprive workers of opportunities to regularly perform tasks with a specific temporal "location" (Zerubavel 1981). Inconsistent schedules treat workers as interchangeable, discouraging individual workers from taking ownership of a particular task. A worker assigned one day to assisting customers, the next to stocking merchandise, and another day to working the register may have little interest in learning how to do any of these tasks better. Even if workers have a chance to practice and improve, why should they try to outdo their coworkers or challenge themselves when all that is expected of them is to show up and do as they are told?

Schedule consistency promotes coworker coordination

Another way that consistent scheduling may lead to better performance is by facilitating coordination among coworkers. By coordination, I mean harmonization or adjustment of action toward a shared end. Coordination may take various forms—increasingly involving digital technologies—but for many tasks, face-to-face communication remains the most expedient or typical way of coordinating work in retail stores. Physical copresence is a minimal condition for immediate coordination. If a retail worker is unsure of where to find something in the store, she will likely find out faster by asking the coworker present with her than by calling a coworker not at work. However, coordination is also facilitated by familiarity and trust between coworkers. Given the choice between calling a coworker she is friends with or asking a coworker she barely knows, the worker in this scenario may prefer the less immediate but more trusted source of information.

Inconsistent schedules inhibit coordination by haphazardly allocating workers to concurrent shifts. As the probability of each worker being in the store at the same time from week to week decreases, the probability of being in the store with the same coworkers decreases exponentially. Two part-time employees—whose shifts cover only a fraction of the weekly hours of operation of their store—can work for months without overlapping. The less likely workers are to work together, the less likely they are to know or trust each other, reducing the likelihood and effectiveness of coordination.

Workers may be able to do without much coordination for basic tasks. But as work demands become more complex or unusual, the more challenging it becomes for an individual worker to fulfill them. On a normal day, workers may perform tasks on the sales floor, at the register, or in the stockroom largely independent of one another. On a busy day, however, customer demand may overwhelm service capacity in one area of the store. In this situation, coordination among coworkers can make the difference between rapidly reallocating workers to meet a surge in demand or leaving customers to wait, grow frustrated, and give up trying to find or buy something.

Complementarity between individual skill and coworker coordination

While I examine commitment and coordination as parallel pathways for productivity gains to consistency, I expect them to have complementary effects. Individual skill formation is facilitated by regular exposure to experienced coworkers who can teach or model job-specific skills. As the average skill level of the workforce increases, coordination among coworkers becomes more effective. Workers who are knowledgeable about store procedures, merchandise, and customers can more easily communicate with coworkers if an issue arises or they need assistance.

Complementarity between commitment and coordination can be understood in terms of positive feedback effects and "co-specific" human and social capital. Effective coordination

153

reinforces workers' investment in their job and relationships with coworkers. Mutual commitment builds trust that in turn bolsters coordination.

Prior literature on complementary forms of human and social capital tends to focus on networks of professionals, artists, or other non-hourly workers. For example, studies of collaboration networks show how social capital facilitates the development of human capital that makes subsequent collaboration more successful (Barley and Kunda 2004). But few studies consider hourly jobs in consumer services as a locus of human and social capital formation. Conventional views of "skilled" and "unskilled" work see retail jobs as unskilled or requiring only very general skills (e.g., literacy) that make retail workers easily replaceable (given some level of primary education). In historical perspective, it is clear that retail work has become less skilled with the rise of mass production, marketing, and self-service. Nevertheless, the notion that retail work is devoid of (specific) skill is an exaggeration that serves only to legitimize class prejudice and low-road business models.

Stable Scheduling Study Design and Data

I use data from the Stable Scheduling Study—an innovative field study of Gap clothing stores located in the Chicago and San Francisco metropolitan areas.[10] This mixed-methods research combines quantitative data from corporate administrative records and employee surveys with qualitative data from manager interviews, worker comments, and focus groups. The study provides a

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[10] Principal Investigators Joan C. Williams, Susan Lambert, and Saravanan Kesavan led the Stable Scheduling Study with funding from the W.K. Kellogg Foundation, the Washington Center for Equitable Growth, the Robert Wood Johnson Foundation, the Institute of International Education in collaboration with the Ford Foundation, the Center for Popular Democracy, the Suzanne M. Nora Johnson and David G. Johnson Foundation, and the Gap. Corporate leaders at the Gap not only granted the research team access to administrative data and store employees, but they also provided important seed funding and staff support throughout the field period. For more detail on the design, administration, and topline findings of the Stable Scheduling Study, see Williams et al. (2018).

highly detailed and contextualized view of the scheduling process and its effects on worker attitudes, behavior, and store performance.

Background on Gap

Founded in 1969 in San Francisco, Gap built its brand around the casual style of the Baby Boomer counterculture, especially Levi's jeans (Nevaer 2001). The company achieved its most rapid growth in the late 1980s under CEO Millard Drexler, who shifted Gap toward a more vertically integrated model of designing, manufacturing, and merchandising private label apparel. Gap's market share and profitability peaked in the 1990s, but it continued to expand its footprint in the US and internationally under its namesake brand as well as through its Banana Republic and Old Navy stores. The company's fortunes reversed in the 2000s, and by the start of the study period, it had closed more than half of its stores in North America (Tabuchi and Stout 2015). In spite of this decline, it remains one of the largest specialty retailers with over $16 billion in sales and 2,296 stores worldwide as of 2018, according to the National Retail Federation.

Apparel has long been one of the riskier segments of the retail sector, especially fashion apparel where styles change and customer demand varies widely, making sales projections more uncertain than for basic goods (Abernathy et al. 1999). In recent years, competition from "fast-fashion" brands like Zara and discount chains like TJ Maxx has pushed Gap and other apparel retailers to accelerate their product cycles, reduce inventories, and aggressively mark down merchandise that isn't moving. Coupled with tight labor budgets, this lean retailing environment leaves managers with little slack to manage an increasingly volatile and fast-moving business. Specialty apparel retailers like Gap have become particularly reliant on just-in-time scheduling, making this a challenging but relevant case for testing an alternative approach.

155

The Stable Scheduling Treatment

At the heart of the Stable Scheduling Study is a multi-component treatment designed to improve the consistency, predictability, adequacy, and input that hourly workers have in the scheduling process. This design is informed by prior field experiments that generated little improvement in employee-rated schedule quality through increasing schedule notice (Lambert et al. 2019b). Principal Investigator Susan Lambert followed an iterative procedure to randomly assign twice as many participating stores to treatment as to control conditions within multiple strata defined by store location, size, and format.[11] Three stores were purposively recruited to help develop and pilot components of the treatment prior to the main study period because of the experience and reputation of the general managers. Since store managers are the primary agents responsible for scheduling, their cooperation was crucial for proper implementation of treatment components or maintenance of control conditions.

I focus on the dimension of schedule consistency, which is a key aspect of the treatment and the one most closely related to my thesis. Two treatment components were designed to primarily target consistency. Managers were instructed to adopt a *stable shift structure* that divided workdays into more consistent starting and ending times. In control stores and treatment stores at baseline, starting and ending times were generated by an algorithm included in the software that managers use to track and plan operations. This software takes sales trends and other store-level information as inputs and generates shifts that optimize staffing levels subject to labor budget and employee availability constraints. Even prior to the intervention period, managers often edited the computer-generated schedules, treating them as a starting point for their own planning and adjustments. Whether

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[11] Twice as many stores were assigned to implement the treatment because of the risk of noncompliance and thus greater heterogeneity in outcomes for the treatment group.

automated or manually created, however, starting and ending times vary as a function of sales trends and staffing targets, but are not constrained to a consistent set of shifts in control stores.

Another treatment component expected to increase consistency is *core scheduling*. Having adopted a stable shift structure, managers were encouraged to schedule employees for the same "core shifts" from week to week. This involved matching employees to shifts based on their typical availability and, crucially, reusing this schedule as the template for subsequent weeks. Prior to the intervention, many scheduling managers relied on their software to simultaneously generate shifts and allocate workers to them. During the intervention, treatment store managers either revised the prior week's schedule to meet projected staffing needs or revised the computer-generated schedule to better match the established shift structure and allocation of workers.

My analyses focus on the contrast between treatment ($Z=1$) and control ($Z=0$) stores. However, it is important to note that the treatment included multiple components, some of which were targeted to a subset of stores or employees. Managers of all stores in the treatment condition ($N = 19$ including the 3 pilot stores) were encouraged to implement three store-wide intervention components: enable employees to (re)allocate shifts through an app, schedule shifts using more consistent start and end times, and schedule employees for more consistent days and times. Treatment stores were also encouraged to offer at least twenty hours per week to a designated group of "part-time plus" employees (usually 10 percent of part-time associates in a store). Finally, a subset of 13 treatment stores received additional staffing hours (typically 4 percent of their weekly payroll hours) targeted for periods determined to be understaffed (in baseline analyses of customer conversion rates). Prior to the start of the study period, the company introduced several policy changes that affected all stores, including those in the control group, requiring managers to post schedules at least seventeen days in advance and eliminate (formal) on-call shifts.

157

The timing and extent of implementation of treatment components varied across stores. The start of the intervention was staggered by region and delayed in some stores due to managers not responding to requests to schedule an initial meeting with all store employees. Most treatment stores implemented most components of the intervention by November 2015 in the San Francisco region and by February 2016 in the Chicago region. Two treatment stores failed to implement most of the components of the intervention for the entire study period (September 2015 through August 2016). A number of other treatment stores experienced manager turnover that interrupted compliance with the intervention. Administrative and qualitative data suggest that most treatment stores followed a trajectory of rapid implementation after the all-store meeting, leading to a peak followed by a gradual decline in compliance. The following list summarizes the study timeline by quarter:

2014 Q1: start of production series (store-level data)
2015 Q1–Q2: treatment components piloted in three stores
2015 Q3: start of timeclock series (employee-level data), intervention begins in San Francisco
        treatment stores
2015 Q4: intervention begins in Chicago treatment stores
2016 Q1: peak implementation of treatment
2016 Q3: intervention ends in all stores
2016 Q4: end of data collection

Researchers on the Stable Scheduling Study collected data from corporate administrative systems, employee surveys, and qualitative interviews with managers. My quantitative analyses rely primarily on administrative data on participating stores provided by corporate managers at Gap. As with many large, publicly-traded corporations, Gap uses sophisticated digital tools to track sales as well as employee characteristics, working time, and pay. Because these data have direct relevance for firm performance, or in the case of employee demographics, legal liability (e.g., for employment discrimination), it seems reasonable to assume that they are reliable. Although cleaning of the timeclock and payroll data revealed some discrepancies in work hours across different administrative systems, there is no reason to believe that the quality or coverage of these data changed over the

course of the study or differed systematically between stores assigned to treatment and control conditions. Thus, for the purposes of my analyses, it is reasonable to assume that these data provide unbiased measures of the key variables of interest.

Sample schedules

To illustrate how the Stable Scheduling Treatment is meant to improve consistency, I present a pair of work schedules: one observed and one hypothetical. Figure 7 depicts four weeks of observed schedules for a part-time sales associate in a control store. This employee works only three to four shifts per week, but the shifts are spread across many different times of the day and days of the week. In fact, of the fifteen shifts scheduled during this period, no more than three end in the same hour. Wednesday is the only day of the week the employee is not scheduled to work during this period. Comparison with the actual start and end times from the timeclock data reveals further, unscheduled variation in working time. Nearly half of the scheduled shifts were not actually worked, while four of the shifts worked did not stop within the hour they were scheduled to end.

Figure 7. Inconsistent schedule of part-time sales associate in Gap control store

Sun	Mon	Tues	Wed	Thurs	Fri	Sat
10:00– 2:00	8:00– 12:00				9:30– 3:30	9:00– 1:00
		8:00– 3:30		8:00– 12:30	2:00– 7:30	10:00– 2:45
	6:00– 10:30	3:30– 8:00				1:30– 5:30
	10:00– 2:00	5:00– 9:30			8:00– 12:45	9:00– 3:00

I now provide a hypothetical illustration of what this schedule might look like under the Stable Scheduling Treatment. Figure 8 represents a "treated" version of the schedule comprising the same number of shifts and comparable hours per week. However, the timing of shifts is much more consistent in this counterfactual version, with only three different start and end times. Note that the employee is not scheduled to work any Sunday, Tuesday, or Wednesday during this period. Such a high degree of consistency is not necessarily typical of treatment store employees. Still it shows more concretely what increased schedule consistency could look like for an individual employee. In the

following sections, I show that there was considerable heterogeneity in the level and growth of consistency over the course of the study.

Figure 8. More consistent counterfactual version of part-time schedule

Sun	Mon	Tues	Wed	Thurs	Fri	Sat
	8:00–12:00	8:00–12:00			10:00–2:00	10:00–2:00
	8:00–12:00	8:00–12:00			10:00–2:00	10:00–2:00
	8:00–2:00	8:00–2:00				3:30–8:00
	10:00–2:00	3:30–8:00			3:30–8:00	3:30–8:00

Qualitative Evidence

I present qualitative evidence from manager interviews and open-ended comments on the employee survey to show that inconsistency is a recognized problem within the stores. As a corpus, the qualitative evidence is very heterogeneous, reflecting both the diversity of the workforce and the wide variation in awareness of and compliance with the study. I select quotes that clearly articulate

relevant themes, but I do not claim that they are typical of the sample as a whole. The one

generalization that is warranted by these data is that negative views of baseline scheduling practices

were more common than positive views of the scheduling treatment, particularly among hourly

associates.

Unfair scheduling and inconsistency

Several associates and even a few managers characterize prevailing scheduling practices as

unfair, not only in their outcomes but also their design. A lead associate in a treatment store

summarizes her coworkers' complaints, identifying inconsistency as one of a host of scheduling

problems:

> Constant feedback from associates is lack of consistent schedules, last-minute
> changes, cutting back hours and then being called at the last minute to come in.
> Feelings of retaliatory cutting of hours to push associates out. Pressure to say YES,
> afraid that they won't be scheduled for hours if they say no.

This comment highlights how experiences of the scheduling process as capricious, coercive, and

retaliatory aggravate frustration with the inconsistent shifts that associates end up working. Other

workers identify inconsistency as a problem in itself and wish for even incremental improvements in

their work-life routine. "It's hard to plan the week when we all get scheduled hours at different times

every week," writes a lead associate in a control store. "It would be great to have two consistent days

off going forward."

Some store managers acknowledge associates' frustration and resentment with just-in-time

scheduling. However, for reasons I will discuss, managers tend to emphasize instability in the

number of hours as the biggest problem with baseline scheduling problems. One control store

manager points to the unfairness of optional scheduling—that is, requiring workers to be available

for more time than they can expect to work: "It's unfair to require twenty hours of availability from

162

staff when we can't provide that many hours." Another manager in a treatment store describes the

disappointment and antagonism that results from cutting scheduled hours:

> Nothing is worse than trying to justify why you have to cut somebody's hours. It puts a damper on the fun, kid mood we are supposed to have here. People can get very catty about their hours.

This comment draws a connection between unfair scheduling and an unpleasant workplace culture

that I will return to under the heading of consistency and commitment.

Before moving on from the theme of unfairness, however, it is important to note that

employees invoke various—and at times opposing—notions of fairness in scheduling. Several

workers object to being consistently scheduled at unsociable or otherwise undesirable times. "It's

not fair for some people to close every weekend and some people never close," one sales associate

writes. "There should be some balance for people who close more often than others." A lead

associate in a control store echoes this idea: "It is not fair to constantly close or open." Comments

like these show the value of a pluralist perspective that does not presume schedule stability or

flexibility are ends in themselves. In workplaces as diverse as these Gap stores, one-size-fits-all

schedule arrangements are unlikely to satisfy many employees, however consistent they may be.

Lean staffing and counterproductive cuts

Many study participants identify scheduling practices that are detrimental not only to the

culture of the store but also its performance. With few exceptions, the practices identified were not

part of the treatment, but rather the status quo or result of changes in management. The problem

most frequently mentioned by managers and workers alike is the lack of adequate hours to perform

necessary tasks. As one store manager observes, "a lot of our scheduling problems are caused by

how hours are allocated." Austere labor budgets lead to chronic understaffing, particularly on the

sales floor:

> They want us to be all about the customers, but they don't give us enough hours to
> even run with one person on the floor. It's so crazy. If you give more hours, we will
> have more people on the floor to get more sales for the store.

This comment from an assistant manager in a treatment store implicitly faults corporate managers

for not giving stores enough hours to provide adequate customer service. A general manager in

another treatment store describes how the leanness of just-in-time scheduling forces her to make

counterproductive cuts in order to offset earlier shortfalls in sales:

> We had one sale this week, so we were busy on Sunday and Monday. But the rain
> slowed down traffic in the store for the rest of the week, so we have to cut hours,
> mostly from the sales floor. It's like robbing Peter to pay Paul—with the sales floor
> understaffed we won't have the wherewithal to sell more to the customers that will
> be coming in.

Some employees are more explicit in blaming corporate managers for the stress and

dysfunction of chronic understaffing. A control store sales associate offers this scathing assessment

of store payroll decisions made by out-of-touch corporate employees:

> The main issue I have with Gap is them constantly cutting payroll, knowing that that
> will just mean less people have to do the same amount of work. […] Corporate has
> no idea what is going on inside the stores because most corporate employees have
> not actually worked in the store. They don't know of the crazy customers we have to
> deal with and the stress of having a million things to get done and no employees
> there to get it done ("because we don't have the payroll"). I wish that they would
> understand that when they cut payroll, there are less associates on the floor to help
> customers, which decreases sales.

More senior employees contrast lean staffing during the study period with more adequate or flexible

staffing practices in the past. One control store manager describes how unyielding pressure to cut

labor costs has produced unrealistic targets that few if any stores attain.

> I don't believe that payroll and productivity were this tight when I started at Gap.
> They are always trying to push us to be faster and more productive. One associate in
> one hour has to markdown 300 units per hour. A couple months ago it was 280; they
> keep raising it. It's unrealistic. My shipping manager is not meeting productivity, so I
> reached out to other stores to see if anyone could help him improve, and I found out
> that no one is reaching their shipment goals.

These comments highlight that lean staffing is at the heart of many of the problems associated with just-in-time scheduling. While some employees complain of last-minute shift extensions or being called in on their day off, shift cuts seem to be more frustrating to frontline managers, workers, and ultimately to customers.

Consistency and commitment

Understaffing on the sales floor is the most obvious manifestation of counterproductive scheduling. But I also find support in the qualitative evidence for the hypothesized relationship between productivity and scheduling consistency. Indeed, some employees view consistency as earned compensation for good performance and reliability. One sales associate attributes his relatively consistent schedule to his greater value to the control store where he works:

> Since I've been with the company for a while and am a consistent and valuable employee, I don't often have my shifts cut, but newer employees often have more shift changes because they generally can't do as much. If the Gap corporation paid for more training time for associates instead of the hours coming from the store, it may make new employees more valuable and result in less shift changes, ultimately decreasing associate turnover.

While this associate views consistency as a reward for skill, he recognizes that a lack of investment in training makes it hard for new associates to advance or even hold on to their positions. A stock associate in a treatment store makes a similar point, but emphasizes regular work rather than additional training as a means of skill formation:

> Have more associates scheduled as they hire so many people and place them only once a week so I feel that they should schedule them more often to allow them to practice skills and get in [the] routine of working, which goes for all departments. I feel that we have so many people but don't schedule them.

Managers echo the idea that schedule consistency directly affects job performance. A control store manager puts it succinctly, saying "with the reactive business climate and instability, the employees aren't always as reliable." Conversely, some treatment store managers attribute improved

performance to greater consistency in scheduling. One manager describes how consistent start times help employees plan their commutes to arrive at work on time:

> I remember before [the intervention] someone saying: "what time do you work tomorrow?" They weren't sure. Now, you only have two choices. It helps with stability for them because they can remember what time to leave to get here on time with public transportation. Knowing that shift is going to be the same week to week. They know what time to leave, what buses to take.

Consistent shift timing is also mentioned in connection with worker attitudes and interaction with their coworkers:

> When you can provide that stability you get more camaraderie and ownership from the employees. People feel ownership that they are part of the regular team that closes on Thursday nights.

Managers credit the Stable Scheduling Treatment with improving the level of morale and performance during the intervention. The most effusive praise comes from a treatment store manager who found consistent scheduling to be an effective means both of eliciting and rewarding good performance:

> It's been good getting people the schedules they need. It's helped with consistency for the schedule too. You always know who's going to be in—you get the people with the right skills at the right times. You get your less experienced people doing returns and have people with better sales skills to be in when we need them to help make the sales. And this is another tool I can use to help show appreciation for our associates. You're going to get a better performance out of people when you treat them that way. When you schedule people willy-nilly all the time people just come in and do the bare minimum to get paid and then leave. Just enough to not get fired.

Obstacles to consistent scheduling

Although managers and workers offer mostly positive assessments of the Stable Scheduling Treatment, they also describe obstacles to implementing consistent scheduling in their stores. The scheduling practices targeted by the intervention are links in a retail supply chain that often pulls operations away from the best laid plans of store managers. These operational pressures come "from below," i.e., customer behavior, and "from above," i.e., corporate procedures and decision makers.

Either way, store managers experience these obstacles and pressures as outside of their control and having to do with the culture of the industry or company.

One such obstacle is the consumer culture associated with discount retail. Like many mass market retailers, Gap relies on promotions to sell merchandise that might otherwise sit in storerooms losing value. A customer in a typical Gap store is wont to find many items or entire sections of the store marked down by 15, 30, even 50 percent. Customers accustomed to this practice may wait until an item is deeply discounted to make a purchase. A store manager describes how customer expectations around discounting amplify business fluctuations and complicate forecasting:

> In our retail environment, customers have got used to a discount. If you dare get away from what they are used to, like J.C. Penney comes to mind, you suffer. When we get away from that, business is tough, and so then they react with a promotion that speeds business up, and then when the promotion is over, business is slow again. If you look at the sales forecast over time, it is very hot and cold.

Promotions affect store operations not only by attracting more customers and unit sales, but also by pushing the workforce to change displays and price tags. In some cases, this promotional work can be scheduled in advance using the "brand calendar" that store managers receive from corporate staff, specifying when changes in merchandise and promotions are to occur. However, many managers complain of promotions that are announced with little advance notice, sometimes in rapid succession:

> Gap is notorious for switching things around last minute. Two weeks ago, we changed promos three times in three or four days. We changed all the signs and the windows each time. Now we have a 50 percent off clearance items sale, which is basically just our fall sale to make space for the holidays, so we could predict it. What we can't predict is that the strategy changes every day.

Such haphazard promotions compel managers either to call in additional staff on short notice or reallocate the staff on hand. Without a proportional increase in the labor budget, managers

may prioritize implementing promotions over assisting customers, exacerbating problems of understaffing due to lean staffing. One manager describes her frustration with this situation, recognizing that it detracts from customers' experience and her own ability to plan:

> When there's a last-minute promo change, we just have to get it done and figure it out. Unfortunately, it affects the customers. It can be confusing what's on sale, the employees are busy making the changes and stores are not signed effectively because the stores are scrambling around trying to make all the changes that weren't planned. I'm a planner, so this is very hard on me. I've had to find a way to make it work for me. I've learned I need to have a visual manager here every morning just in case. But the other managers feel like it's unfair. They ask why the visual manager doesn't ever have to close, but I need her here in the mornings.

In addition to unpredictable promotions, managers identify other aspects of corporate governance that interfere with stable scheduling. Periodic visits by regional and senior management motivate store managers to change schedules in order to make things more presentable. Corporate managers do not allocate additional hours for this purpose since the point of visiting a store is to see it as it is. But store managers try to make the best impression on their superiors, even if this means moving around workers and hours that could be used more productively later in the week or elsewhere in the store. A more episodic though not infrequent source of instability are shakeups in corporate leadership, which prompt new executives to "prove themselves" or "make their mark" by initiating abrupt changes in policies or performance targets (Nevaer 2001).

Interviews with managers reveal that just-in-time scheduling is experienced at the store level not as a coherent strategy for optimizing labor input, but as a repertoire of heuristics and tactics for maintaining satisfactory performance under conflicting and often unpredictable constraints. Store managers exercise discretion over labor scheduling, but their decision-making is often driven by corporate directives and customer behavior over which they have little control. One treatment store manager, reflecting on the tension between the culture of the company and the principle of stable scheduling, reports a positive change during the study period:

168

It's stuff that, in theory, I thought about, and it seemed like the right thing to do. But at the time, the culture wasn't there. It was almost as if our people were pawns on a chessboard that we used to get an end result out of. The mindset has just changed. We're now seeing that if I take care of these people, they're willing to work their best for me. We achieve more.

Other managers view treatment-induced changes as more limited and temporary. They cite industry or store norms as an obstacle for getting employee "buy in" for more stable scheduling. Given a labor force accustomed to short-term, low-commitment retail jobs, managers alone cannot ensure that shifts are worked consistently according to the schedule. "It's hard for us in retail to find good, loyal employees," one manager observed. "There are no careers in retail." However exaggerated, this statement expresses a widespread attitude that a temporary and targeted intervention seems unlikely to change. This casual attitude toward retail work manifests not only in turnover, but also in employee requests for schedule changes, which can generate instability for their coworkers. A treatment store manager describes how worker expectations for schedule flexibility can undermine a manager's attempt to maintain consistency or increase commitment:

> [Managers] try to be fairly flexible. One reason [associates] like this job is for the flexibility. They like being able to request time off, and I can't really say no. If I try to deny a request off and schedule them anyway, they probably just won't show up. I had a great employee who wanted to take on more responsibility here, and I was excited about that, but then she changed her mind.

Remarks like these illustrate the challenges involved in maintaining a consistent schedule given routine changes in store operations and employee availability. Some managers and workers report that the Stable Scheduling Treatment improved this situation, in part by promoting greater commitment to the schedule. But others see more continuity than change. In order to rigorously assess the effects of the treatment, I turn to the quantitative data on labor scheduling and productivity.

Quantitative Measures and Methodology

In this section, I present the measures and methods I use to analyze the relationship between consistency and productivity in the Stable Scheduling Study. The main outcome I analyze is labor productivity. I adopt a standard definition of productivity as output per unit input, specifically sales per labor hour. Sales are measured in unit counts and dollar totals at the point of sale and recorded in the source data by store at multiple timescales, from weeks down to 15-minute intervals. I use the weekly sales series, which has the same frequency as the payroll series from which I obtain store labor hours. After calculating productivity for each store-week (n = 4,316) in the observation period, I aggregate to store-quarters (n = 332) by taking the mean. The quarterly productivity series is less volatile than the weekly series and corresponds in frequency to my preferred measures of consistency.

Measures of consistency

For my mediation analyses I introduce several novel measures of the consistency of employee working time. Conceptually, all of these measures seek to capture similarity among sets or sequences of work shifts. However, they focus on distinct forms of consistency, yielding alternative interpretations and potentially different results. The basic challenge for the quantitative researcher is that working time has multiple dimensions—with timing, duration, and recurrence being the most pertinent to consistency—which can be quantified, weighted, and validated in many different ways (Zerubavel 1981; Liao and Fasang 2021). In choosing among plausible alternatives, researchers may also face a trade-off between more intuitive and more encompassing measures of similarity.

Most prior studies of work schedules focus either on the usual shift timing or number of hours worked per week. Time diary and panel studies examine actual working time, but often focus on the same dimensions. Standard measures of "variable hours" and "irregular schedules" confound

170

multiple dimensions of temporal variation and are not suitable for studying incremental changes in consistency (Fugiel and Lambert 2019).

More relevant for the purposes of this study are continuous measures of instability, such as the coefficient of variation (CV) that LaBriola and Schneider (2020) use to analyze CPS panel data on hours worked. The CV is an attractive measure for several reasons: (1) it is scale invariant; (2) it can be interpreted as the average share of hours that vary week to week; and (3) it is already well established in research on income and price volatility. I adapt it as a measure of hours *stability* by taking the complement, as shown in equation 6. The quotient on the right is the CV, calculated as the standard deviation divided by the mean of weekly hours.

$$\tau = 1 - \frac{\sigma}{\mu} \tag{6}$$

Although time diaries often lack longitudinal data, some research extends the study of individual time use by comparing sequences of activities across individuals and social groups (Flood et al. 2018; Lesnard 2008). This comparative research makes use of cross-sectional measures of sequence similarity that can be adapted to study the consistency of work timing within employees over time. I build on this approach to construct a measure of schedule *commonality* as the proportion of working time (binned into 15-minute increments) worked at the same time from week to week. This measure is equivalent to Jaccard's "coefficient of community," defined as the "overlap over union" of two sets (Jaccard 1912; Hubálek 1982).

I calculate commonality using week-level data on working time coded into 672 timeslots, one for each 15-minute increment of the week (7 days * 24 hours * 4 increments = 672). Once the timing and duration of working time is coded as a sequence of increments, the commonality of any two workweeks can be calculated as the number of matching increments worked in both weeks

divided by the number of distinct increments worked. Equation 7 expresses the commonality measure in more formal terms.

$$\varphi = \frac{1}{K} \sum_{k=1}^{K} \frac{m_k}{n_k} = \frac{2}{w(w-1)} \sum_{i=1}^{w-1} \sum_{j=i+1}^{w} \frac{m_{ij}}{n_i + n_j - m_{ij}} \tag{7}$$

This equation gives two equivalent formulas for the commonality coefficient φ: the mean proportion of common increments across all K pairs of weeks or, equivalently, the sum of common increments as a share of the distinct increments worked across each pair of w weeks weighted by the reciprocal of the binomial coefficient $\binom{w}{2}$.

To calculate this measure, I first create a binary presence indicator p_{tw} that equals 1 for each 15-minute increment worked at time $t = \{1, \dots, 672\}$ for week w. I then obtain the numerator m_k for each pair of weeks w and w' indexed by $k = \{1, \dots, K\}$, summing the products of p_{tw} and $p_{tw'}$ as shown in equation 8 below.

$$m_k = \sum_{t=1}^{672} p_{tw} * p_{tw'} \tag{8}$$

Finally, I calculate the number of distinct increments by adding the number of increments worked in each week and subtracting the number of common increments, according to the relation implied by the denominators in equation 7: $n_{w,w'} = n_w + n_{w'} - m_{w,w'}$. As a proportion, the commonality coefficient is bounded to the range [0, 1]. Its value depends on three primary parameters—the number of common increments, the number of distinct increments worked, and the number of weeks w in the reference period, which determines the number of combinations K. If the indicators p_{tw} are random binary variables, then commonality should tend toward 0.5 as w increases to

infinity. Conversely, we would expect to obtain more extreme values ($\phi = 0$ or $\phi = 1$) when w is small. I impose a minimum threshold of $w \geq 3$ to reduce the number of outliers while still retaining the majority of employees in the sample (75 percent of employee-store-quarter observations).

I interpret the commonality coefficient as the degree of consistency or similarity of workweeks *over time*. It is possible to construct an analogous measure of similarity *across employees,* which I term *synchronicity*. I use Gower's (1971) similarity index, which is similar to the measure of "routine" that Hamermesh (2005) uses to analyze consistency across multi-day time diaries. It is calculated using the same procedure as the commonality index except that the numerator counts matching slots twice and the denominator counts all slots worked. Thus, for each pair of employees i and j, we sum $\sum 2 * m_{ij}/(n_i + n_j)$. Because the denominator is simply the duration of work (in 15-minute increments), this measure ensures that shifts of equal duration are weighted equally in calculating store-level synchronicity, regardless of how many distinct shifts a pair of employees work in a given week.

The commonality and synchronicity coefficients have the advantage of capturing consistency with respect to timing and duration. However, by treating pairs of workweeks as the unit of analysis, these measures neglect consistency at finer resolutions of time. Notably, they do not capture consistent timing of shifts within a workweek. If an employee works on the same days of the week and around the same blocks of time from week to week, but starts and ends work at a different hour each shift, this may create problems for work-life integration similar to those posed by working variable days of the week. For this reason, I introduce an alternative measure of consistency that is calculated across all shifts in a given quarter, regardless of the week in which they occur.

I define this alternative consistency measure as the *concentration* of shift timing. Timing may be specified in various ways, but here my interest is primarily with the hours of the day when shifts

173

start or end. I describe the calculation in terms of end times but the same procedure can be applied to start times, midpoints, or other aspects of shift timing. I begin by rounding timeclock observations to the nearest hour $h = \{1, \dots, 24\}$. I then create a series of indicators e_{hd} that equal 1 when a shift ends at hour h on day d. I calculate concentration as the sum across the hours of the day of the squared shares of shifts ending at each hour, summed across all D days worked in the reference period. Equation 9 gives the formula for this calculation.

$$\pi = \sum_{h=1}^{24} \left(\sum_{d=1}^{D} \frac{e_{hd}}{D} \right)^2 \tag{9}$$

This measure is based on the familiar Herfindahl-Hirschman index of market concentration. However, here it has a more intuitive interpretation as a probability. If we were to randomly select two days worked in a given quarter, the probability of ending work at the same time is π.[12] To maintain this probabilistic interpretation, I obtain an aggregate measure of concentration by taking the sum of employee-specific probabilities weighted by the share of shifts they contribute to the total number of shifts worked in the store in a given quarter. Equation 10 expresses the relation between the individual- and store-level concentration measures. Note that these quantities can be rewritten in terms of shift indicators by substituting $n_i = \sum_h \sum_d e_{ihd}$ and $N_s = \sum_i n_i$.

$$\pi_s = \sum_{i=1}^{I} \frac{n_i}{N_s} \pi_i \tag{10}$$

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[12] Technically, π is the probability of selecting two days on which shifts end at the same hour with independent draws from the set $\{1, \dots, D\}$ (with replacement). This may differ from the probability of selecting days with the same ending hour in successive draws (without replacement), especially when there is only one shift that starts at a given hour. I adopt the independent draws formula because it simplifies calculation and seems a reasonable proxy for the expectation of working another shift with the same timing as a previous one. This prospective expectation is what I seek to capture with my measure of concentration.

Figure 9. Distribution of pooled quarter-level commonality values by treatment condition
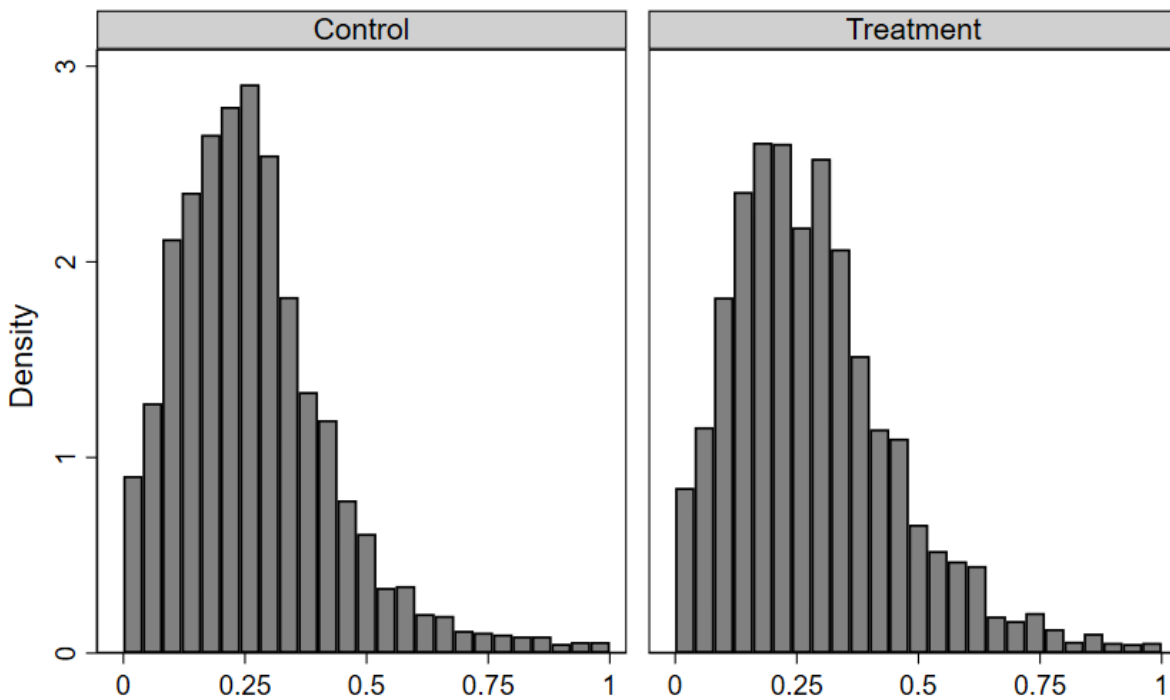
Figure 9 shows the distribution of my commonality measure at the employee-quarter level, pooled across quarters but separated by treatment condition. In both control and treatment stores, the distribution is right-skewed, with the bulk of observations lying around 0.25, some observations at the zero lower bound, and very few near 1. In treatment stores, there are more observations above 0.25 and, to a lesser extent, above 0.5, which is suggestive of a positive treatment effect.

Figure 10. Chronograms for three employees at different percentiles of commonality distribution
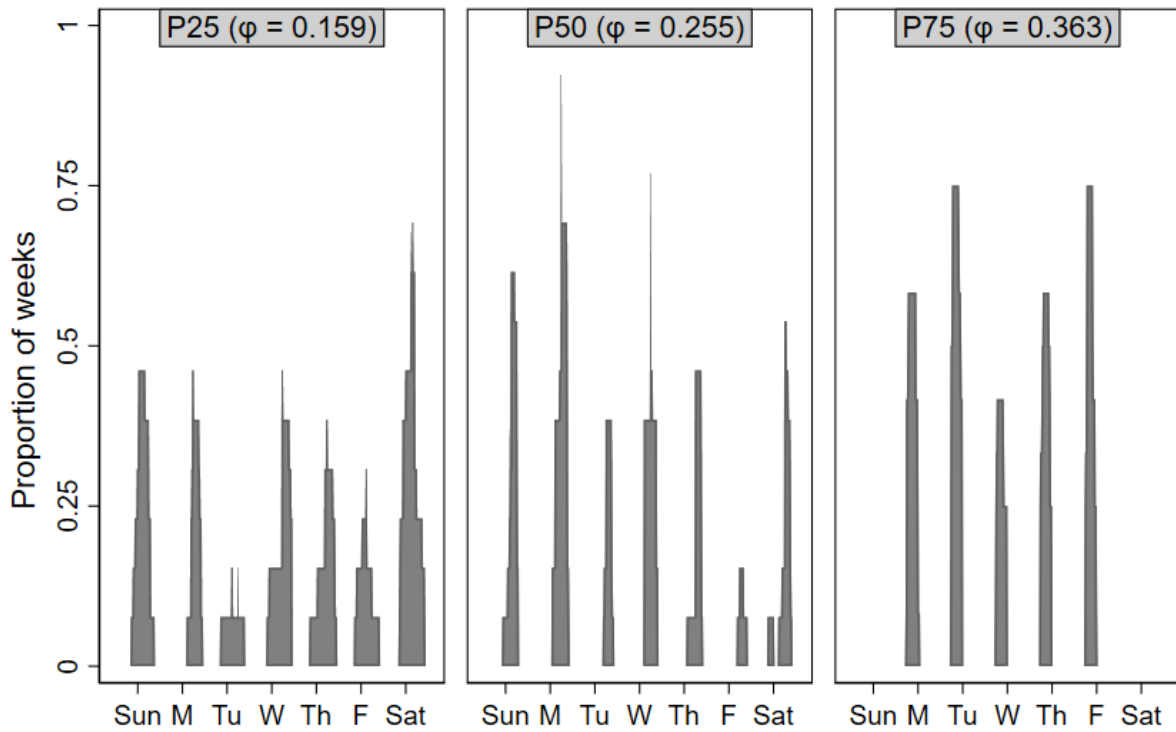
To illustrate what the commonality coefficient measures, figure 10 displays three chronograms of working time at different levels of consistency. These chronograms depict working time as a shaded area whose height corresponds to the proportion of weeks in the quarter when the employee was present at work (including paid breaks and unpaid meal times). The horizontal axis represents time as 15-minute increments arrayed from Sunday AM to Saturday PM with tick marks corresponding to noon (local time) on each day. The three panels of figure 9 show time at work for employees near the 25th, 50th, and 75th percentiles of the pooled quarter-level commonality distribution.

The left panel represents a low level of commonality (0.159) in working time. Note that this employee works each day of the week at least once in the course of the thirteen-week quarter, but the only time worked most weeks is Saturday afternoon. The shaded areas have a triangular shape

with peaks in the early to mid-afternoon and a base that extends into the morning or late evening. This pattern indicates greater dispersion in the starting and ending times as compared with the other employees. In the middle panel, corresponding to a moderate level of commonality (0.255), working time is spread across a more limited range of hours. Thus the shaded areas tend to have a higher peak and narrower base than in the first panel. At the high level of commonality (0.363) shown in the right panel, working time is even less disperse, occurring only on weekdays during late morning hours. The shaded areas have a rectangular shape, exceeding 0.5 on Monday, Tuesday, Thursday, and Friday, indicating that the employee works these days most weeks of the quarter.

Figure 10 reveals that my commonality measure captures the degree of dispersion or alignment of working time across weeks. The lower the commonality, the more uniformly work is dispersed over different times. The higher the commonality, the greater the alignment of working time from week to week. In principle, commonality can vary independently of the number of hours. Empirically, I observe a slight correlation between the average weekly hours and the commonality of working time on a quarterly basis (0.26). Part-time employees who work relatively few hours tend to have lower consistency than full- or part-time workers with higher average hours.

Validation of consistency measures

Given the novelty of my measures of consistency, it is important to evaluate their validity. I conduct two kinds of validation exercises. I first look at the pairwise correlations between measures that I expect to converge or discriminate between theoretically distinct dimensions of working time. I then use employee survey data to assess the strength of the association between subjective and objective measures of related constructs.

Table 10 presents a correlation matrix for my measures of consistency and other statistics of interest calculated from the administrative data at the employee-quarter level. Seniority is defined as

months since the hire date in the final month of the quarter. Weekly hours are observed in either the timeclock or payroll data and averaged across all weeks of employment during the quarter. Based on prior research and the hypothesized relationship between consistency and commitment in employment, I expect seniority to be positively associated with all measures of consistency. Reading down the first column of table 10, I find that all correlations are in fact positive. Seniority is most strongly associated with commonality ($\rho = 0.39$), whereas it is weakly associated with hours stability and synchronicity. The associations with start- and end-time concentration are modest, but similar in magnitude to the association between seniority and mean weekly hours (0.20).

Table 10. Correlation matrix of employee seniority, hours, and consistency measures

	Seniority	Hours	Weeks	Stability	Start concen.	End concen.	Common.	Synch.
Seniority	1.00	0.20	0.17	0.13	0.23	0.18	0.39	0.11
Mean weekly hours	0.20	1.00	0.35	0.64	-0.26	-0.31	0.26	0.84
N. weeks	0.17	0.35	1.00	0.43	-0.11	-0.14	0.24	0.20
Stability	0.13	0.64	0.43	1.00	-0.11	-0.13	0.32	0.48
Start-time concentration	0.23	-0.26	-0.11	-0.11	1.00	0.76	0.52	-0.30
End-time concentration	0.18	-0.31	-0.14	-0.13	0.76	1.00	0.50	-0.31
Commonality	0.39	0.26	0.24	0.32	0.52	0.50	1.00	0.23
Synchronicity	0.11	0.84	0.20	0.48	-0.30	-0.31	0.23	1.00
N. obs.	6,871	6,886	6,886	6,886	6,886	6,886	6,886	6,886

Note: Pearson correlation coefficients calculated between measures at employee-quarter-level using casewise deletion and a minimum of three weeks of administrative data.

For the number of hours, I expect divergent associations for different measures. Prior research finds that retail workers who work fewer hours per week are able to work a more consistent set of shifts than those who work any and all shifts they are offered in order to maximize their hours (Jany-Catrice and Lehndorff 2005; Lambert et al. 2012). This would imply a negative association between average hours and the consistency of timing. To the extent that employees are able to

maintain full-time or near full-time hours by accepting inconsistent timing, there should be a positive association between the level and stability of hours and negative association between hours stability and start- or end-time concentration. Mean weekly hours should also be positively related to synchronicity with coworkers, since workers who are present in the store for longer will be more likely to overlap with others, particularly full-time coworkers.

Mean weekly hours are strongly associated with my measures of stability and synchronicity. Indeed, the strength of this association is somewhat surprising. Recall that stability is calculated as the complement of the coefficient of variation, which is a ratio of the standard deviation to mean hours paid per week. Dividing by the mean yields a scale invariant measure, but does not eliminate the strong association between the level and stability of hours. The association between mean hours and synchronicity is so strong (0.84) as to suggest either that coworking patterns are largely a function of hours or that this measure fails to capture much alignment net of "structural" similarity in the number of hours worked (Chenu and Robinson 2002). This latter interpretation is consistent with the negative association between synchronicity and the "pure" timing measures, start- and end-time concentration. As expected, these measures are negatively associated with the number of hours, although the association is somewhat stronger with end-time concentration (−0.31) than start-time concentration (−0.26).

Commonality is positively associated with all of the other consistency measures, despite the negative association between hours and timing. The correlations of commonality with start- and end-time concentration are approximately equal in magnitude ($\rho \approx 0.5$). The correlation with hours stability is weaker (0.32), but still greater in magnitude than the correlation between commonality and mean weekly hours or synchronicity (0.23). This pattern of associations suggests that, for the purposes of my study, commonality is the best summary measure of consistency in working time. By

contrast, my measure of synchronicity is more limited than expected, mainly capturing structural overlap between coworkers who work a similar number of hours per week.

As a further validation exercise, I examine how closely the "objective" measures of consistency calculated from the administrative data correspond to employees' self-rated schedule quality on select survey items. The employee survey includes multiple sets of questions designed to capture schedule quality along multiple dimensions, including hours, timing, advance notice, and input. Different sets of questions prompt employees to assess schedule quality in retrospective, prospective, or affective terms. I select those items that refer to the same or similar constructs as each type of objective measure.[13] All of these items used a four-point scale defined either in terms of agreement (strongly agree, agree, disagree, strongly disagree) with a statement or satisfaction (very satisfied, satisfied, dissatisfied, very dissatisfied) with some feature of their working time. For the objective measures, I use the quarter observed closest to the start of the field period for each wave of the survey. Respondents to both waves of the survey contribute two observations to the calculation. Table 11 displays the survey items related to each of three consistency measures along with the pairwise correlation coefficient.

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[13] To conserve space, I do not present validation results for end-time concentration, which are similar to those for start-time concentration. Synchronicity does not appear in table 11 because there are no survey items related to this construct.

Table 11. Pairwise correlations between objective and subjective measures of consistency

Measure	Survey item	Correlation
Commonality	I am generally scheduled to work the same days each week.	0.260
	Although some of my shifts may change from week to week, there are certain shifts I can count on working almost every week.	0.264
	I can easily anticipate which days I will work each week.	0.235
	I can easily anticipate which days I will have off each week.	0.200
	How satisfied are you with the days you work each week?	0.178
	How satisfied are you with the times you work each week?	0.144
	How satisfied are you with how stable your schedule is from week to week?	0.227
Hours stability	I am generally scheduled to work the same number of hours each week.	0.036
	I can easily anticipate how many hours I will work each week.	0.088
	How satisfied are you with the number of hours you work each week?	0.084
Start-time concentration	I am generally scheduled to begin work about the same time each workday.	0.365
	I can easily anticipate what time I will begin work each workday.	0.281
	How satisfied are you with the times you work each week?	0.190

I find modest associations between subjective and objective measures of commonality and start-time concentration. The strongest correlation (0.365) is between start-time concentration and agreement with the statement, "I am generally scheduled to begin work about the same time each workday." The correlation is somewhat weaker with the prospective version of this statement ("I can easily anticipate what time I will begin work each workday"), although the second statement lacks the "about the same time" qualification of the first. The correlation is weaker still between start-time concentration and satisfaction with timing, which is not specific to start times. Commonality is most strongly correlated (0.264) with the statement meant to capture the "core

scheduling" component of the treatment: "There are certain shifts I can count on working almost every week." The correlations with anticipation and satisfaction are again somewhat weaker. Note that, of the satisfaction items, commonality is more strongly associated with "how stable your schedule is from week to week" than similar items that ask either about days or timing of work. This reinforces my interpretation of commonality as a more encompassing measure of consistency that captures multiple dimensions of working time.

I find very weak associations between my measure of hours stability and survey items that ask about consistency in the number of work hours. The correlation coefficient is significantly different from zero ($\rho = 0.088,\ p < 0.05$) only for the statement: "I can easily anticipate how many hours I will work each week." Whatever its formal and interpretive merits, the complement of the coefficient of variation does not seem to capture what respondents to the survey have in mind when they rate the consistency of their work hours.

Level of analysis

I conduct analyses primarily at the store-quarter level. Some degree of temporal aggregation is necessary in order to measure consistency, which I define with reference to a set of several shifts or workweeks. The fewer elements the reference period contains, the more unstable my measures of consistency would be from one period to the next. I use thirteen-week quarters as my temporal unit of analysis.[14] This periodization yields more stable aggregate measures while allowing me to account for seasonal effects on apparel sales and store operations. It also accords with the convention of

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[14] I use standardized quarters based on the National Retail Federation's 4-5-4 calendar (n.d.). This calendar divides the year into four quarters, three of which are always thirteen weeks long and a fourth that periodically includes a fourteenth "leap" week to keep in sync with the Gregorian calendar. The Stable Scheduling Study spans the 2014 through 2016 years of the NRF calendar, none of which include a leap week. For my purposes, the main advantage of the NRF calendar is that each thirteen-week quarter has the same number of days of the week (i.e., thirteen Sundays, thirteen Mondays, etc.).

reporting business results on a quarterly basis. I aggregate consistency and other individual

characteristics to the store level because this is the level at which treatment assignment and

implementation occurred.

Definition, identification, and estimation of causal effects

I conduct a series of analyses to quantify the effects of the Stable Scheduling Treatment on

consistency and productivity. I begin by analyzing the treatment-productivity relationship without

mediation. The estimand of interest is the intent-to-treat effect (ITT), which I define as the expected

increase in productivity during the intervention period caused by assignment to the treatment rather

than the control condition. This counterfactual quantity can be expressed as $ITT = E[Y(1) -$

$Y(0)]$, where $Y(1)$ is the potential outcome under the treatment condition, $Y(0)$ is the potential

outcome under the control condition, and $E[\cdot]$ is the expectation of the difference between these

potential outcomes. I assume that treatment assignment is ignorable given randomization.[15] Under

this assumption, the ITT can be identified by the observed difference between the average

productivity of treatment and control stores or, more formally, $\delta^{ITT} = E[Y|Z = 1] - E[Y|Z = 0]$,

where Z is an indicator of assignment to the treatment condition.

Estimation of the ITT is complicated by the staggered intervention and seasonal fluctuations

in productivity. The timing and length of the intervention period differ across stores, with most (but

not all) Bay Area stores entering the intervention period during the fourth quarter of 2015 and most

Chicagoland stores entering the intervention period during the first quarter of 2016. Recent

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[15] Because the three pilot stores were not randomly assigned to treatment, I conducted each analysis with and without them, i.e., using the full sample of twenty-eight stores or using only the subsample of twenty-five stores randomly assigned to treatment or control conditions. Unless otherwise noted, the results are substantively the same for both samples.

econometric work shows that a two-way fixed-effects estimator weights observations across multiple time periods according to length of time spent in the intervention, which can negatively bias the aggregate estimate in the presence of heterogeneous or time-varying treatment effects (Goodman-Bacon 2021; Callaway and Sant'Anna 2020). To reduce this bias, I disaggregate the ITT into relative-time effects, also known as an "event study," represented by equation 11 below. I estimate this model using the traditional TWFE method as well as the aggregated difference-in-difference estimator developed by Callaway and Sant'Anna (2020).

$$Y_{it} = \alpha_t + \alpha_i + \beta x_{it} + \sum_{k=-5}^{4} \delta_k D_{jt} * I_k + u_{it} \tag{11}$$

The event study model predicts productivity for store i in quarter t as a function of quarter fixed effects α_t; a store fixed effect α_i; the natural logarithm of customer traffic x_{it}; and a series of time-specific effects corresponding to leads and lags of the start of the intervention period ($k = 0$). The indicator variable D_{jt} specifies the quarters that correspond to the leads and lags of the start of the intervention for treatment group j, while I_k is 0 in the quarter when the intervention starts and 1 otherwise. I use robust standard errors clustered at the store level for inference.

I hypothesize that δ_k is zero for all $k < 0$ and greater than zero for all $k > 0$. Given the difficulties some managers reported implementing the treatment, I expect that δ_k will reach its maximum value after one or more quarters in the intervention. Thus, the more precise estimand of interest is the maximum value of the ITT during the intervention period, which can be expressed as $ITT^* = E[Y(1) - Y(0)|X = x, T = t^*]$, where t^* is the quarter during the intervention when maximum treatment efficacy occurs, controlling for customer traffic.

Treatment effects on consistency

As a preliminary step toward mediation analysis, I also analyze the effect of treatment (ITT) on each of the consistency measures. For a given consistency variable M, I define this effect as $ITT^M = E[M(1) - M(0)]$, which is the expected difference between the potential level of consistency under the treatment condition and the potential level of consistency under the control condition. I identify this counterfactual quantity with the difference between the average change in consistency among treatment stores and the average change in consistency among control stores from baseline to intervention, conditioning on pre-treatment covariates: $\beta_M^{ITT} = E[\Delta M | Z = 1, X] - E[\Delta M | Z = 0, X]$. Because I have only a single baseline quarter of the timeclock and payroll series, I estimate this effect using a difference-in-difference design with two periods: baseline (2015 Q3) and intervention (2016 Q1). Equation 12 represents the model used for estimation, where I is an indicator of the intervention period, Z is an indicator of assignment to the treatment condition, and the parameter β_3 estimates the ITT. Again, I use robust standard errors clustered within stores.

$$M_{it} = \beta_0 + \beta_1 I + \beta_2 Z + \beta_3 IZ + \beta_4 X + u_{it} \qquad (12)$$

Treatment effects on productivity mediated by consistency

The analyses described above can establish whether the Stable Scheduling Treatment was effective in improving schedule consistency and labor productivity. But to evaluate whether greater consistency is a mechanism for increasing productivity, I conduct a further analysis that decomposes the total treatment effect into an indirect effect that operates through a change in the level of consistency and a direct effect that operates through other channels at constant consistency. Here the estimand of interest is the natural indirect effect (NIE), which I define as the change in productivity caused by the treatment-induced change in consistency. In terms of potential outcomes,

the NIE is defined as the difference between the potential productivity outcome under the treatment

condition when consistency attains the level induced by treatment and the counterfactual potential

outcome of assignment to treatment if consistency was unaffected by the treatment. In formal

notation, this definition can be expressed as $NIE = E[Y(1, M(1)) - Y(1, M(0))]$, where

$Y(1, M(1))$ is the potential outcome under the treatment condition with the mediator value

corresponding to treatment and $Y(1, M(0))$ is the potential outcome under assignment to the

treatment if, counterfactually, the mediator attained the value it would under the control condition

(Hong 2015).

Identifying the NIE requires additional assumptions, which I summarize in figure 11. I

assume there is no confounding of the treatment-mediator (Z→M) or treatment-outcome (Z→Y)

relationships. I also assume that there are no unmeasured confounders of the mediator-outcome

(M→Y) relationship, controlling for X. I include in X pre-treatment covariates that are common

causes of the mediator and outcome—for example, the average age of associates in the store. Pre-

treatment covariates measured at baseline are used to ensure temporal precedence over the mediator

and outcome, which are measured during the intervention (2016 Q1).

Figure 11. Directed acyclic graph of causal relationships
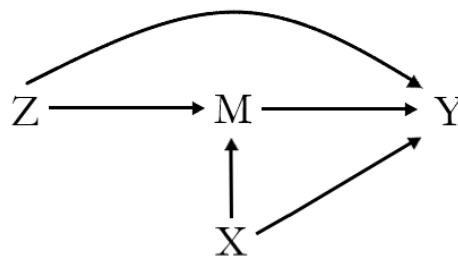
I follow the method of Valeri and VanderWeele (2013) to estimate mediation effects that

allow for treatment-mediator interaction. Given the multi-component design of the Stable

Scheduling Treatment, I expect that there are complementarities between treatment components

such that consistency has a stronger effect on productivity in treatment stores than in control stores.

For example, treatment store employees can use the Shift Messenger app to make peer-to-peer

schedule changes, which might counteract more consistent scheduling by managers, but also result

in fewer instances of employees missing scheduled shifts, coming to work sick, or being preoccupied

at work with more pressing personal matters. In potential outcome terms, this hypothesis can be

expressed as $E[Y(1, M(1)) - Y(1, M(0))] > E[Y(0, M(1)) - Y(0, M(0))]$, where the left-hand

side of the inequality is the NIE and the right-hand side is the pure indirect effect (PIE). I define the

PIE as the expected change in productivity under assignment to the control condition if consistency

attained the level it would under assignment to the treatment condition.

Equations 13 and 14 represent the regression models I use to estimate the causal mediation

effects of interest:

$$E[M|x, z] = \beta_0 + \beta_1 z + \beta_2 x \tag{13}$$

$$E[Y|x, z, m] = \theta_0 + \theta_1 z + \theta_2 m + \theta_3 mz + \theta_4 x \tag{14}$$

Equation 13 regresses consistency on treatment assignment z and covariates x, whereas equation 14

regresses productivity on covariates, treatment assignment, consistency, and the consistency-by-

treatment interaction mz. If these models are correctly specified and the assumptions represented in

figure 11 hold, then the NIE can be identified with the following combination of parameters:

$(\theta_2 + \theta_3)\beta_1$. I use bootstrap standard errors for inference since the product of model coefficients

may not be normally distributed. I hypothesize that this effect is positive, which I would interpret as

evidence that the effect of treatment assignment on productivity is mediated, at least in part, by

increased consistency of working time. I estimate the NIE separately for each mediator in order to simplify estimation and inference.

Control variables

I use control variables to address potential confounding and improve the precision of the treatment effect estimates. Given the cluster-randomized assignment of the Stable Scheduling Treatment, I do not expect confounding of the treatment-mediator or treatment-outcome relationships. In the following section, I conduct a balance test for these key variables at baseline. In my event study of time-varying treatment effects on productivity, I control only for the natural logarithm of average weekly customer traffic using administrative data from footfall counters installed at store entrances. Traffic is strongly correlated with sales and productivity in the same quarter, but does not differ significantly by treatment assignment. Including it as a control reduces unexplained variance and thus yields more precise estimates of the parameters of interest (Hong 2015).

I include additional controls in my mediation analysis since random assignment of the treatment does not necessarily satisfy the assumption of no confounding of the mediator-outcome relationship. My selection of controls is informed by prior research and knowledge of conditions in the sample stores. As discussed in the previous chapter, retail workers have different orientations toward their jobs, which influence their availability and commitment. Age is one of the most important predictors of worker orientations as younger workers are more likely to view their retail jobs as temporary and more likely to have other sources of financial support (Ikeler 2016; Misra and Walters 2016). For these reasons, I control for the mean age of store employees in the year preceding the intervention.

Another potential confounder of consistency and productivity is customer traffic. As I have already noted, traffic drives sales, which in turn influence the labor budget and scheduling. While managers can respond in different ways to customer demand and budget constraints, I expect that schedule consistency is affected by the level and variability of traffic. In my difference-in-difference and mediation models, I control for the natural logarithm and the inverse of the coefficient of variation of weekly traffic for the year preceding the intervention. These variables were transformed to better approximate a normal distribution.

I also control for region—that is, whether the store is located in the San Francisco or Chicago metropolitan areas. Although region was one of the stratifying variables for randomization, there is some evidence of divergence in manager practices and store performance over the course of the intervention period. Manager turnover appears to be higher and compliance with the intervention lower on average in San Francisco stores, according to monthly field notes recorded by study personnel. Since managers were pivotal to implementing the treatment, differences in manager training and compliance could affect both schedule consistency and productivity.

Table 12 presents descriptive statistics for the outcome, mediator, and control variables as well as other store characteristics. For variables measured on a quarterly basis (i.e., productivity and consistency), only statistics for the baseline quarter are presented. For ease of interpretation, variables are summarized in their natural scale, without logarithmic or other transformations.

Table 12. Store-level characteristics of Stable Scheduling Study sample

Characteristic	Mean	Std. dev.	Min.	Median	Max.
Sales per labor hour	$127.26	$17.72	$85.24	$129.99	$157.02
Foot traffic per week	5,689	4,142	1,663	4,520	22,351
Traffic instability (CV)	0.028	0.008	0.017	0.027	0.045
Workforce size	44	34	16	32	160
Share of associates full-time	17%	5%	0%	16%	25%
Hours per associate	12.9	3.7	6.4	11.9	23.6
Region (San Francisco)	0.46	0.51	0	0	1
Hours stability	0.512	0.081	0.343	0.515	0.657
Commonality	0.255	0.057	0.158	0.253	0.404
End-time consistency	0.235	0.049	0.128	0.231	0.349
Manager tenure (months)	17.7	19.7	1.0	10.5	88.0
Median seniority (months)	29.6	12.4	9.5	29.3	58.0
Share with 2+ years seniority	49%	14%	0%	53%	71%
Mean employee age	29.5	3.1	23.7	28.9	37.8
Share 30 years or older	35%	13%	0%	35%	59%
Share of workforce male	24%	13%	0%	28%	43%
Share of workforce Black	17%	13%	0%	13%	47%
Share of workforce Hispanic	27%	13%	7%	26%	65%
Median wage	$11.04	$1.19	$10.00	$10.55	$14.44

Note: Statistics are store-level aggregates of production measures calculated at store-week level, consistency measures calculated at employee-quarter level, and demographic characteristics observed in monthly store census.

Quantitative Results

In this section I present results from my quantitative analyses. I begin with descriptive results that help test identifying assumptions for my causal analyses, including the ignorability of treatment assignment and parallel pre-treatment trends. The descriptive results appear consistent with my assumptions, although they also show little divergence of treatment from control stores on key variables during the intervention period. I then turn to my regression results, which provide little evidence of hypothesized treatment effects on productivity or consistency.

Balance test

I test for balance between treatment and control stores on the outcome and mediator variables. Differences on these measures could indicate anticipation of the treatment or a pre-trend that would undermine my causal identification strategy. Table 13 lists the mean and standard deviation for the outcome and mediator variables by treatment condition. The last two columns show the differences and t statistics, which confirm there is balance on these key measures despite the small and unequal size of the treatment and control groups.

Table 13. Productivity and consistency at baseline by condition

Measure	Treatment		Control		Difference	t statistic
	Mean	Std. dev.	Mean	Std. dev.		
Sales $/hr. labor	126.95	13.88	127.90	25.00	−0.949	0.11
Commonality	0.253	0.059	0.259	0.055	−0.006	0.25
End-time consistency	0.237	0.054	0.230	0.038	0.006	−0.34
Hours stability	0.502	0.083	0.518	0.086	−0.016	0.46
Synchronicity	0.152	0.028	0.147	0.033	−0.005	−0.36

Note: Statistics calculated using store-level means. T test assumes unequal variances.

Timeplots

I now examine productivity and consistency trends over time. Figure 12 plots mean quarterly productivity for treatment and control stores. As expected, it shows parallel trends marked by seasonal variation. It also provides some prima facie evidence of a positive treatment effect since the treatment line lies mostly below the control line prior to the intervention and mostly above it subsequently. However, productivity falls to its lowest level in the first quarter of 2016, below the seasonal low points in the baseline period. Given the lag between when this decline occurs and when the intervention begins, it seems unlikely to be a pure Hawthorne effect. But it could be due to some other exogeneous shock.

Figure 12. Productivity trends by treatment condition
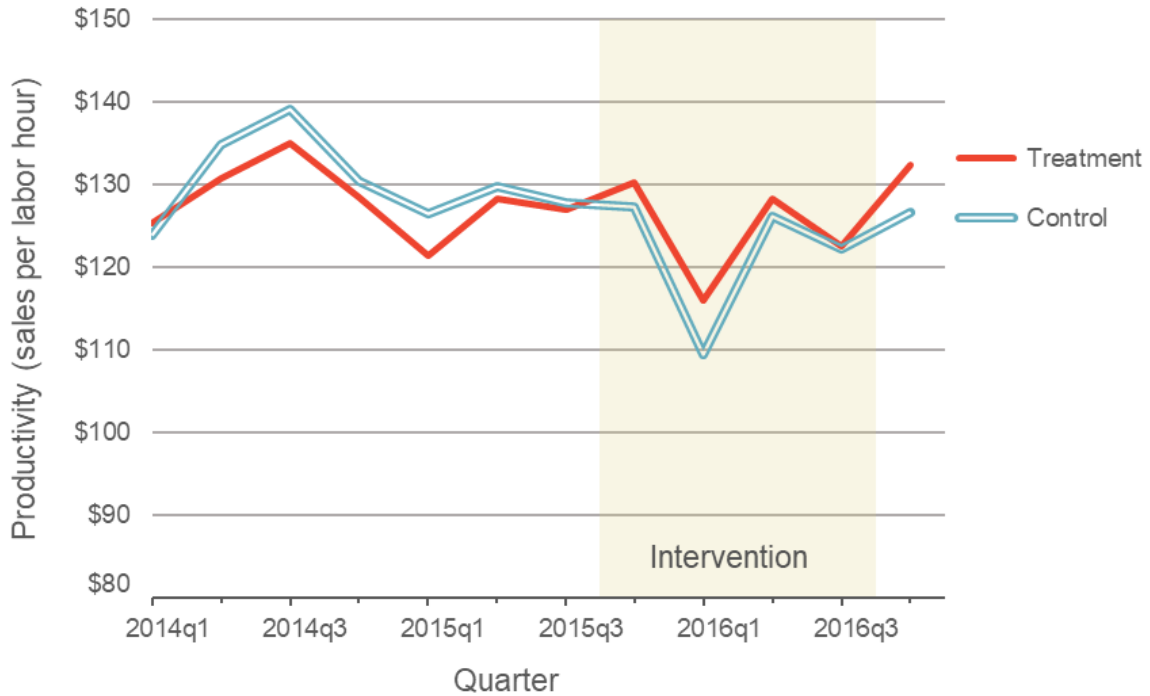
Figure 13 plots each of my four preferred consistency measures by treatment condition over the five quarters for which I have data on hours. Since I only have one quarter of baseline data for all stores (with the exception of the pilot stores), it is not possible to test for pre-treatment trends. However, I see largely parallel trends in treatment and control stores with some modest divergence during the intervention period. This divergence is most apparent for the stability of paid hours and commonality measures, both of which are higher in treatment than in control stores beginning in the first quarter of 2016. End-time concentration is consistently higher in treatment stores throughout the study period. Synchronicity changes little, suggesting coworker patterns are relatively stable, at least by this measure.

Figure 13. Consistency trends by treatment condition
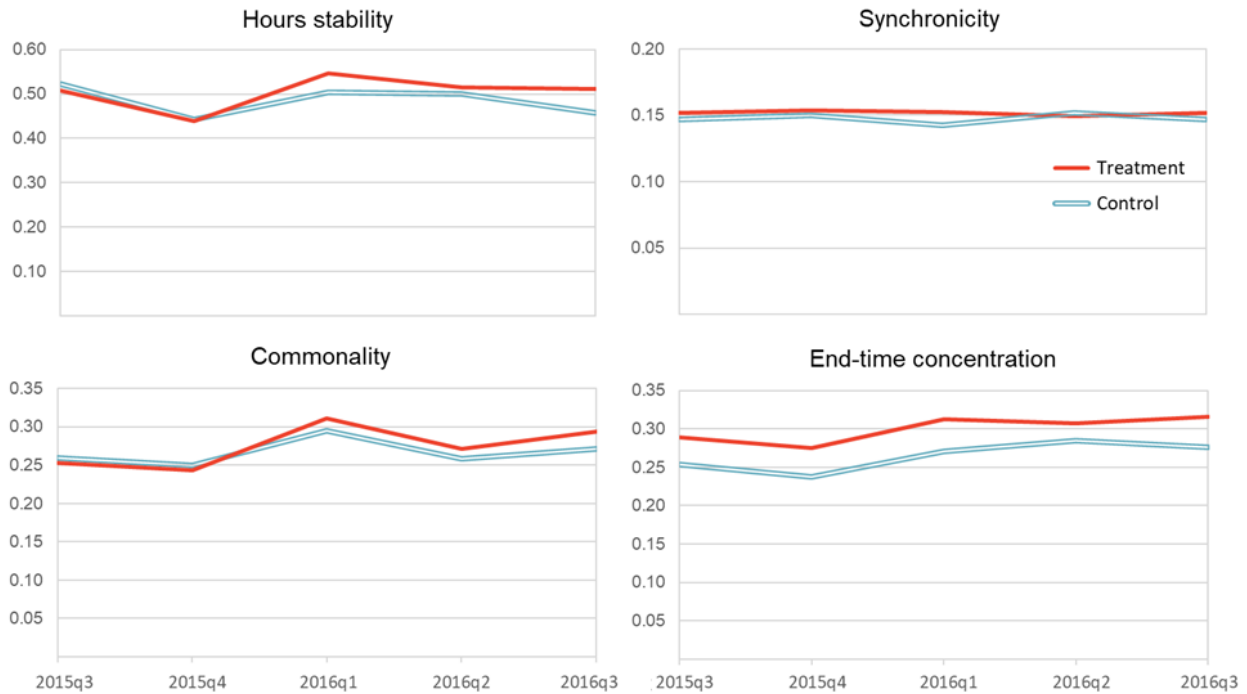
Event study of productivity

For a more focused view of changes in productivity that takes into account the staggered nature of the intervention, I turn to an event study of ITT effects. Figure 14 plots predicted leads and lags of the quarter in which different groups of stores began the Stable Scheduling Treatment: 2015 Q2 for pilot stores, 2015 Q3 for San Francisco stores, and 2015 Q4 for Chicago stores. Since these panels are unbalanced, I bin the first and last sets of observations to include timepoints of equal or greater distance from the intervention (i.e. 5 and 6 quarters prior to the intervention are binned together in the first timepoint). For each timepoint, figure 14 shows the treatment effect estimates and 95 percent confidence intervals from a pair of estimation methods: two-way fixed-effects and the difference-in-difference estimator developed by Callaway and Sant'Anna (2020). The

main difference between these methods is whether previously treated stores serve as controls (with

TWFE) or only never treated stores (with CSDID).

Figure 14. Event study of treatment effects on productivity
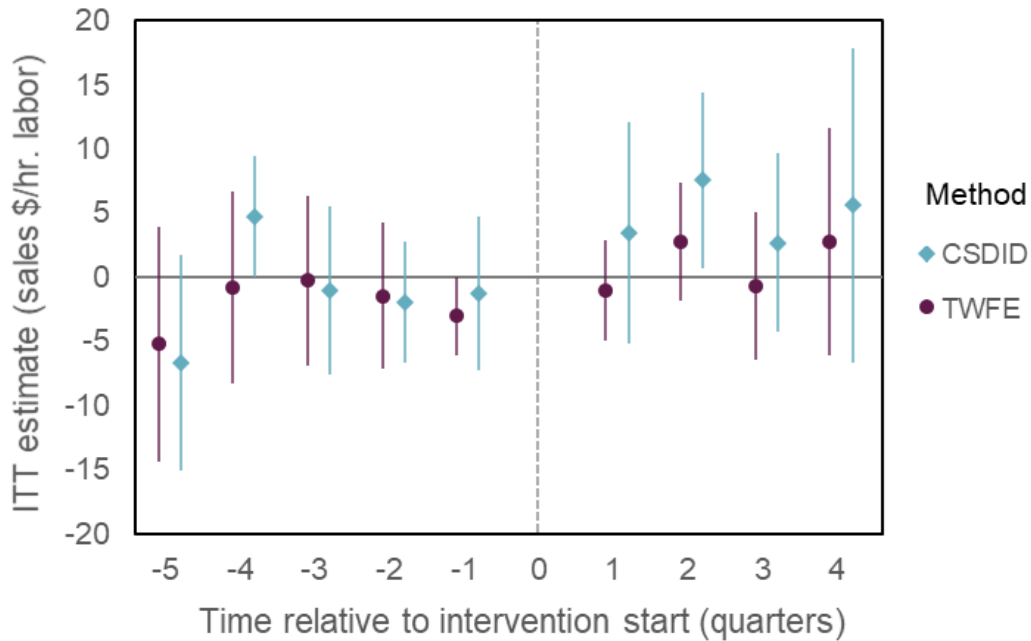
Note: TWFE = two-way fixed-effects estimator, CSDID = Callaway and Sant'Anna difference-in-difference estimator.

The event study shows little evidence of a treatment effect on productivity. The TWFE

estimates of the ITT do not significantly differ from zero at any point. There are significant

differences in the CSDID estimates, notably a productivity increase of $7.56 per labor hour

(approximately 6 percent of the mean) in the second quarter following the start of the intervention.

However, this effect goes away if the three pilot stores are excluded (results not shown). The

CSDID estimates also show an increase in productivity among treatment stores one year *prior* to the

intervention, which suggests a violation of parallel trends or confounding of the treatment-

productivity relationship. Given these discrepancies, I regard the more conservative TWFE results as more plausible.

Difference-in-difference analysis of consistency

Although the event study provides little evidence of a treatment effect on productivity, there could still be effects on consistency that would help to interpret the productivity results, i.e., by disconfirming the hypothesized consistency-productivity relationship. I test for treatment effects on consistency by estimating separate difference-in-difference models with controls for possible confounders. Table 14 shows the coefficient estimates and standard errors from these models. I center continuous covariates at their means so that the constant approximates the mean outcome for the reference group of Chicagoland control stores at baseline (2015 Q3). The parameter of interest is the interaction term (Intervention period × Treatment assignment), which estimates the ITT. This effect is not significantly different from zero for any of the consistency measures. The most sizable effect I find is for the commonality measure, which is on average 0.066 (12.7 percent) lower in San Francisco than in Chicago stores. These results are similar if the three pilot stores are excluded.

Table 14. Difference-in-difference estimates of treatment effects on consistency

	Commonality		End-time concentration		Hour stability		Synchronicity	
	Coeff.	s.e.	Coeff.	s.e.	Coeff.	s.e.	Coeff.	s.e.
Intervention	0.036	0.018	0.018	0.014	−0.016	0.029	−0.005	0.007
Treatment	−0.001	0.018	0.006	0.014	−0.008	0.029	0.009	0.012
Int. × Treat.	0.022	0.023	−0.002	0.020	0.062	0.037	0.006	0.009
San Francisco	−0.066***	0.016	−0.026	0.014	−0.042	0.027	−0.013	0.015
Ln(traffic)	0.031*	0.011	0.021	0.013	0.040	0.021	0.017	0.010
CV traffic^{-1}	0.002	0.001	0.001	0.001	0.003*	0.001	0.001	0.001
Mean age	0.006*	0.002	0.007***	0.016	0.003	0.004	−0.001	0.002
Constant	0.286	0.017	0.242	0.013	0.532	0.027	0.150	0.011
r-squared	0.521		0.383		0.294		0.234	
N	56		56		56		56	

Note: Robust standard errors clustered at the store level. * $p < 0.05$, ** $p < 0.01$, *** $p < 0.001$.

Mediation analyses

My final set of results are for the mediation analyses of treatment effects on productivity via consistency. Table 15 displays estimates from modified regression models that include a treatment-mediator interaction and bootstrap standard errors. These models control for the same pre-treatment covariates as in my difference-in-difference models, but I present only the treatment effect estimates. The natural indirect effect (NIE) is the parameter of interest, which represents the expected change in productivity caused by a change in consistency from the level it attains under the control condition to the level it attains in the treatment condition, holding constant exposure to the treatment. My estimates of the NIE are negligible for all measures of consistency. None of the treatment effects from this mediation analysis are significantly different from zero.

Table 15. Modified regression estimates of mediated treatment effects

	Commonality		End-time concentration		Hours stability		Synchronicity	
	Coeff.	s.e	Coeff.	s.e.	Coeff.	s.e.	Coeff.	s.e.
Natural indirect effect	0.206	2.24	0.004	2.10	−0.594	3.42	0.705	2.46
Natural direct effect	3.03	8.54	3.20	8.47	3.49	8.70	2.31	8.71
Total treatment effect	3.23	7.99	3.20	8.13	2.89	7.40	3.02	7.85

Note: Standard errors estimated using bootstrapping.

Discussion

This chapter presents an organizational study of the relationship between consistency and productivity of working time in retail sales. I elaborate on the conceptual trade-off between optionality and commitment by identifying several mechanisms whereby mutual commitment to a consistent schedule may improve labor productivity. I conceptualize consistency as the degree of similarity along one or more dimensions of working time (e.g., duration, time of day, day of the week) from shift to shift or week to week. I argue that consistency promotes the formation of specific skills and facilitates coordination among coworkers. However, optionality—particularly the

iterative, cost-minimizing strategy of just-in-time scheduling that is common among lean retailers—disrupts these processes of investment in human and social capital, potentially reducing the productive capacity of the workforce. This argument leads me to the hypothesis that an increase in schedule consistency should improve labor productivity, at least relative to the low baseline of just-in-time scheduling.

To test this hypothesis, I take advantage of a unique field experiment involving twenty-eight Gap clothing stores as part of the Stable Scheduling Study. Participating stores were randomly assigned to a control condition, characterized by unstable, just-in-time scheduling, or a treatment condition in which managers were encouraged to adopt a more consistent overall shift structure, schedule workers for the same core set of shifts from week to week, and provide a soft guarantee of minimum hours for designated part-time workers. In combination with other components relating to staffing levels and peer-to-peer schedule adjustments, the Stable Scheduling Treatment was designed to improve schedule consistency, predictability, input, and adequacy for hourly workers (Williams et al. 2018). This experimental design allows me to identify the effects of a change in scheduling practices while holding constant many possible confounders of the consistency-productivity relationship.

I quantify and validate several measures of consistency using corporate administrative and employee survey data. Two measures perform well in capturing relevant aspects of consistency. My preferred measure is a similarity index I term *commonality* based on Jaccard's "coefficient of community" (Jaccard 1912). Calculated as the proportion of matching 15-minute increments of work between a pair of weeks, this measure captures alignment in the days of work as well as shift timing and duration. A second measure captures similarity specifically in starting or ending times, which I term *concentration* based on the Herfindahl-Hirschman index. By contrast, my measure of

197

synchronicity, based on Gower's similarity index, seems mainly to capture the share of full-time employees rather than similarity in coworking patterns of the mostly part-time workforce. I also find problems with my measure of hours stability, calculated as the complement of the coefficient of variation in the number of hours worked per week, which is weakly related to subjective measures of stability and sensitive to the number of weeks observed in a given quarter. I recommend that future research consider alternative measures of the (in)stability of work hours, such as duration-sensitive dissimilarity measures used in sequence analysis (Studer and Ritschard 2016).

More surprising than these mixed validation results is the lack of quantitative evidence of treatment effects. Across a variety of specifications, I fail to reject the null hypothesis of no treatment effect either on consistency or productivity. Diagnostic tests for pre-treatment balance and parallel trends suggest this result is not an artifact of treatment anticipation or preexisting differences on observable characteristics of stores. Rather, the "dosage" of the Stable Scheduling Treatment appears insufficient to increase consistency at the quarter level. This dosage problem makes it difficult to draw clear conclusions regarding the relationship between consistency and productivity. While I find little evidence of a treatment effect on quarterly productivity, in the absence of a treatment-induced change in consistency, I cannot interpret the null productivity result as evidence against my thesis. The evidence is inconclusive.

An obvious limitation of these analyses is the small sample size of twenty-eight stores participating in the field experiment. Given the multiple components of the treatment and heterogeneity in implementation, there may be insufficient power to detect mediated treatment effects at the store level. But even if the sample was considerably larger, the Stable Scheduling Treatment may not yield the expected benefits without additional changes in store organization and operations. Because store managers play a critical role in the scheduling process at Gap, as in many

retailers, compliance with a given set of scheduling practices—whether just-in-time or stable scheduling—is liable to vary or break down without an experienced manager. This was an obstacle that field researchers encountered with several treatment stores in San Francisco, which may have contributed to the lower average level of consistency in this region. As retailers and other service sector employers increasingly rely on third-party scheduling and personnel management software, there may be opportunities for researchers to intervene in scheduling practices more directly by randomly assigning stores to different default settings or functionality of this software.

At the same time, the qualitative evidence reveals broader obstacles to implementing stable scheduling in retail and clothing stores in particular. Like many other apparel brands, Gap has adopted a "lean retailing" model that aims at rapid turnover of merchandise with minimal staffing. The merchandising and staffing constraints of this model frequently come into conflict, generating instability within the firm's own operations that translate into inconsistent schedules for employees. Shipments, displays, markdowns, and other changes in merchandise require more labor hours to execute than the lean baseline for staffing. But these changes occur on an unpredictable schedule, requiring managers to make schedule changes or reallocate staff on hand away from sales functions. Instability also results from corporate governance arrangements, with store managers given changing directives for how to budget or run their operations, at times with little warning or rationale. Faced with this volatile environment, some retail workers do not expect or want longer term commitment in their jobs. Even a manager who makes a deliberate effort to schedule associates for consistent shifts and promote a promising associate into a position of greater responsibility may confront a workplace culture characterized by low commitment.

Temporal consistency is only one factor in a labor process where results depend on many others. Workers given consistent schedules may not apply themselves or even remain long in a job if

they feel underpaid, out of place, or otherwise dissatisfied. They may not see a future for themselves in a job with few opportunities for promotion or upward mobility, however consistent the schedule. They may not work well with coworkers from a different background or who do not share their attitude or approach to the work. Even with good coworker relationships, they may find the disrespect of managers or customers intolerable. And whatever good will or comradery does develop within the store may be undermined by unreasonable demands from corporate managers. For all these reasons, the positive effects of more consistent schedules may be modest overall and negligible in many cases. But this does not mean the status quo is optimal. Given the obstacles to implementing stable scheduling within a single store or firm, broader governance arrangements—such as scheduling legislation and regulation—may be necessary to establish what alternatives are feasible and what benefits they might offer.

Chapter 5. Precarious Schedules as a Social Problem

In recent years, precarious schedules have emerged as a social problem of concern not only to the workers who experience them, but to sociologists of work and the broader public. Precarious schedules render working time unstable and unpredictable, putting workers' health, livelihood, and relationships at greater risk of disruption (Ananat and Gassman-Pines 2021; Lambert et al. 2019a; Schneider and Harknett 2019; Snyder 2016). Although unstable scheduling is not a new phenomenon, it has taken on greater sophistication and significance in the contemporary United States. Relatively unconstrained by statutory or collectively bargained labor standards, US employers have engineered just-in-time scheduling to expand, contract, and rearrange labor input to match the ebb and flow of business, drawing on a pool of labor available at minimal fixed cost to the employer. Precarious schedules trade on the allure of flexibility and ambivalence toward standard employment, but they allow workers little real autonomy or opportunity for advancement. Precarious schedules impede workers from planning their lives or devoting time to the people who depend on them, contributing to a widespread sense of time pressure (Boushey 2016; Wajcman 2016).

Labor scholars, advocates, and journalists are increasingly scrutinizing precarious schedules, highlighting their connection to more familiar problems of poor job quality and social inequality. A growing body of research and reporting documents the extent and magnitude of schedule instability in low-wage service jobs (Alvarez et al. 2020; Schneider and Harknett 2019; Guendelsberger 2019; McCallum 2020). Women and workers of color are not only overrepresented in such jobs, but also bear a disproportionate share of the risks associated with precarious schedules (Luce et al. 2014; McCrate 2012; Storer et al. 2020). Organizational research has called into question the advantages of

unstable scheduling for employers, emphasizing the costs and trade-offs involved in "low-road," low commitment employment models (Carré and Tilly 2017; Ton 2014; Williams et al. 2018). This research and reporting have fed into campaigns for scheduling standards championed by labor unions, advocacy organizations, and progressive government officials (Figart 2017; Fugiel and Lambert 2019).

My dissertation contributes to scholarly and public understanding of this topic by reframing concepts, refining measures, and conducting novel analyses of the origins, functions, and effects of precarious schedules. In this final chapter, I summarize the contributions of my research and discuss its implications for scheduling policy and practice. I begin by considering the public debate that this research seeks to inform. I draw attention to the discursive frames that orient this debate toward distinct, though not necessarily rival, moral goods. I situate my research in relation to these currents of debate, reflecting on the motivations for my approach. I then elaborate on the implications of my research for public and private governance of scheduling risk. I offer recommendations for strengthening and extending scheduling regulation, especially with regard to the stability of hours and earnings for hourly workers. In the penultimate section, I recapitulate the major claims and findings of the dissertation, emphasizing their significance for sociological scholarship. I conclude with suggestions for future research extending and complementing this line of inquiry by addressing certain limitations of the present study.

Framing the Problem of Precarious Schedules

Although scheduling has come to public attention as a social problem relatively recently, it connects to perennial themes in social policy (Heath 2011). I distinguish three main themes or "frames" that recur in public discussion of precarious schedules in the US labor market. These

frames differ in what kinds of scheduling practices they see as problematic and what policy response they envision.

Autonomy

The first way of framing the problem of precarious schedules is as a violation of worker autonomy. The freedom to choose how to spend one's time, and more specifically, whether to spend it working for pay or in other pursuits, is fundamental to the notion of the labor market as a market (Hägglund 2019). It is what distinguishes labor as a voluntary act from servitude as an involuntary condition of the worker. Precarious schedules violate this principle by subordinating worker autonomy to employer discretion over the timing and hours of work. Recall the on-call worker who depends on her employer to realize the value of her working time. She may prepare to work but end up idle or be called in to work unexpectedly. In either case, her time is not really her own.

One could extend this argument to a more radical critique of wage labor. The "choice" to work is always subject to the need to earn a living in a capitalist society that offers many people few viable alternatives to renting out their time and agency to an employer (Weeks 2011). On this view, the subordination of the on-call worker may differ in degree but not in kind from the lack of freedom inherent in market dependence. But this argument goes too far in reducing work for pay to a kind of servitude, what once was called "wage slavery" (Roediger and Foner 1989). It collapses the distinction between the on-call worker and the freelancer, treating the latter's independence as partial if not illusory.

Yet this is a minority view in public debates around scheduling. Rather than a radical critique of the need to work, critics of precarious schedules tend to frame the problem in terms of illegitimate or excessive employer discretion. These critics do not contest the prerogative of

employers to schedule work; they propose protections against employers making arbitrary or capricious scheduling decisions. The most prominent proposal in this vein is a minimum length of advance notice, typically fourteen days (NWLC 2019). Advance schedule notice protects the autonomy of workers, allowing them to plan their lives outside of work. Just as standards for the length of the working day or workweek recognize the right to time off from work, standards for advance notice recognize the right of workers to spend their time in ways that involve planning or commitment (Rose 2016). For reasons I discuss in chapter 1, availability to work on short notice precludes nonwork commitments or immersive activities.

Advance notice standards also resemble work hours standards in that they allow compensation to substitute for strict adherence to the standard. The Fair Labor Standards Act (FLSA) does not prohibit work in excess of forty hours per week so long as covered workers receive premium compensation of at least one and half times their regular rate of pay. Similarly, fair workweek laws allow employers to change schedules with less than two weeks' notice if they pay a premium, e.g., an extra hour of pay for each additional shift and half of the scheduled hours for each shift cancelled. But some fair workweek laws go beyond the FLSA in granting workers the right to decline this trade of premium compensation for employer discretion. Worker autonomy is protected not only by disincentivizing employers from not adhering to the advance notice standard, but also by barring retaliation against workers who refuse to work shifts on short notice (NWLC 2019). Under the FLSA, by contrast, employers can require overtime and fire workers who refuse it (Golden and Wiens-Tuers 2005).

Inequality

Another way of framing the problem of precarious schedules is as an unfair allocation of risk and reward that exacerbates other forms of inequality. This is perhaps the most common frame

adopted in the sociological literature on public advocacy around scheduling issues (Clawson and Gerstel 2014; Luce et al. 2014; McCrate 2012). Racial minorities and other marginalized groups of workers are more likely to experience precarious schedules and to suffer worse schedule-related outcomes than White and otherwise advantaged workers (Finnigan 2018; Golden and Kim 2018; Schneider and Harknett 2019). This inequality in scheduling partly reflects occupational segregation, but Black and Hispanic workers report greater schedule instability than their White counterparts, even within the same large retail firms (Storer et al. 2020). Moreover, inequality in income, wealth, and other resources compound the insecurity and hardship that can result from precarious schedules (Alvarez et al. 2020; Reich and Bearman 2018). The meager social safety net that exists in the US can mitigate some of these detrimental effects, but high barriers to access and often sluggish administration make it ill-equipped to provide timely relief for workers with unpredictable schedules and volatile earnings (Alexander et al. 2015; Lambert and Henly 2013).

The inequality frame is the most expansive in that it focuses not on the scheduling process per se but on the unfair allocation of precarious schedules to already disadvantaged groups of workers. In this way, it connects the problem of precarious schedules to broader movements for racial, gender, and immigration justice. It can inform the search for benchmarks of schedule quality by identifying reference groups of workers, i.e., White men, who tend to have better jobs in numerous respects. This benchmarking on more advantaged workers helps explain why scheduling standards not only adapt provisions from union contracts, but often cover *only* nonunion workers in targeted industries. The assumption seems to be that union members already enjoy comparable or better protections. But this is not necessarily the case, particularly in industries with low union density or "two-tier" contracts that set much lower standards for a subset of workers (Block et al. 2006; O'Brady 2019). Moreover, benchmarking offers little guidance as to what kinds of schedule

arrangements are fair in principle. For this reason, the inequality frame is often combined with appeals to worker autonomy to make the case for specific scheduling standards.

Social welfare

A third way of framing the problem of precarious schedules is as a private business practice that is detrimental to social welfare. While relatively few proponents of scheduling regulation invoke this frame (Boushey 2016), opponents often cite compliance burdens or costs when arguing against regulations (American Consumer Institute 2019; French 2016). A welfare frame is commonplace in evaluations of economic arrangements, weighing benefits and costs by magnitude and perhaps some principle of distribution (Pareto 1971; Pigou 1932). It assumes at least a rough quantitative measure and conversion rate for different kinds of risk. In reality, jobs typically come in discrete bundles with little negotiation let alone market pricing of schedule arrangements (Mas and Pallais 2017; McCrate et al. 2019). Nonetheless, I believe that a social welfare frame could bolster arguments for scheduling regulation while more directly countering economic objections.

This belief helps motivate the risk governance framework I develop in this work. I build on prior research by labor and operations scholars who argue that unstable scheduling and other low-commitment employment practices can result in higher costs for businesses and negative externalities for workers, customers, and the larger economy (Appelbaum and Batt 1994; Lambert 2000; Ton 2014). Employee absenteeism, turnover, and poor performance are the business costs most often cited in connection with precarious schedules. But the spillover effects of precarious schedules on health and relationships outside of work also have welfare implications (Boushey 2016). Indeed, one can formulate many common objections to precarious schedules in terms of social welfare. The right to advance notice or compensation for schedule changes, discussed above in terms of worker autonomy, may contribute to social welfare by facilitating sociability and "quality

time" with loved ones, activities that rank highly in self-reported happiness and well-being (Young and Lim 2014). A social welfare frame is particularly relevant for discussions of unsociable schedules and the right to receive accommodation for caregiving, schooling, and other nonwork responsibilities.

Implications and Recommendations for Policy and Practice

My dissertation offers novel concepts, measures, and empirical evidence that can inform public and private responses to the problem of precarious schedules. On a conceptual level, my work seeks to clarify common points of confusion about the nature and extent of scheduling problems. Building on foundational notions of schedule control and risk shifting, I develop a theoretical framework that distinguishes schedule arrangements according to the magnitude and allocation of risk along multiple dimensions of working time, including advance notice, timing, and duration. This multidimensional approach avoids the limitations of traditional categories that lump together qualitatively different "nonstandard" arrangements and neglect functional differences in the allocation of risk within ostensibly "standard" arrangements. In combination with more precise measures of schedule variation, such as those available in recent rounds of the NLSY97, my framework makes it possible to distinguish unstable arrangements—characterized by variation over which workers have little control—from stable schedules as well as from flexible arrangements in which workers exercise greater control over schedule variation.

I demonstrate how this functional typology of schedule arrangements sheds new light on the nature and extent of scheduling risk. Most relevant for the public debate around scheduling regulation, I show that young workers are not compensated for scheduling risk with higher pay, greater job security, or beneficial flexibility. On the contrary, I find that jobs with unpredictable and unstable schedules are much less likely to offer workers the benefit of a flexible work schedule.

207

Workers with unstable schedules also report less job satisfaction than in otherwise comparable jobs with stable schedules. These findings contradict the claim by opponents of fair workweek laws that workers enjoy greater flexibility and opportunities for advancement in jobs without stable schedules. My research suggests that, at least in terms of compensation, workers have nothing to lose from policies that require advance notice or premium pay for schedule changes.

It is important to note that these compensation penalties for scheduling risk are not limited to nonunion or service workers. They hold even with controls for union coverage and broad industry and occupational groups. In fact, workers in my sample report higher rates of schedule instability and worse flexibility penalties in union than in nonunion jobs. In a related vein, I find that the pay penalty for erratic schedules is greatest when the local unemployment rate is low, even though this is when workers should be in a stronger bargaining position relative to their employer.

Explaining these puzzling results is a task for further research. But I believe they can already help reorient scheduling policy beyond targeted protections for those workers assumed to be most vulnerable and move toward broader standards to supplement or substitute for private governance, whether collective or individual. My research extends the economic rationale for scheduling standards by challenging efficiency- and power-based explanations of schedule arrangements. If a union contract and low unemployment are not sufficient to ensure that workers are compensated for the costs of schedule instability, then government regulations should either prohibit the practices that generate this negative externality or, if it is as valuable as employers claim, redistribute a greater share of the rewards to the workers who bear the scheduling risk.

I recommend a dual approach to strengthening scheduling protections for workers while allowing some flexibility in implementation. The principle is to guarantee either hours or earnings for workers who make themselves available to work within a given period of time. In the retail and

food service context, the week seems the most obvious period for stabilization, so the expected availability could be specified as a number of shifts or hours per week. Hourly workers who are available to work at least this much should be guaranteed a minimum number of work hours or earnings for the week. For example, a store manager can hire a part-time sales associate with the expectation that the worker is available to work at least twenty-four hours per week during any of six possible closing shifts, say, Monday through Saturday from 3 PM to 9 PM. Unless the worker requests time off or otherwise indicates limited availability, the employer should guarantee the worker a minimum of twenty hours of work or the equivalent gross pay each week. If the regular pay rate is $15 per hour, then the worker should receive a minimum of $300 per week, whether the manager offers twenty hours of work or only twelve. The specific quantities of hours and earnings could be negotiated at the individual establishment or firm level, subject to local regulations that set higher standards for certain industries or occupations. Nonetheless, it is crucial to establish a federal standard as a floor for hourly workers to plan and budget around.

The principle of guaranteed hours or pay is premised on the commensuration of time and money in wages. However, its primary effect would be to increase the fixed costs of retaining wage labor. Rather than a "straight" hourly wage, employees would in effect receive a base salary plus wages for any hours above the minimum. This hybrid compensation would protect workers against the risk of sudden shortfalls in earnings while leaving intact the relationship between extra hours and earnings. Workers not exempt from the FLSA would still earn an overtime premium, which constitutes a disincentive for employers as much as a reward for employees. The goal is not to convert hourly workers to salaried employees, but to regulate inadequate or excessive hours of work. Further regulations may be needed to limit overwork among FLSA-exempt employees, but here the

governance problem is complicated by the greater independence and blurred distinction between work and nonwork time for many salaried professionals.

Guaranteed hours or pay would bolster existing fair workweek provisions, but should not substitute for a holistic approach to scheduling regulation. My research highlights the multiple dimensions and sources of scheduling risk, including unpredictable or inconsistent timing as well as unstable hours of work. Existing fair workweek laws mainly target unpredictability, requiring at least a week's advance notice or monetary compensation for schedule changes. While these laws often include provisions such as a "good faith estimate" of normal weekly hours and "access to hours" for existing employees before additional workers are hired, early research suggests these provisions have not increased average hours in regulated establishments. On the contrary, some researchers find a modest decrease in days worked for covered workers following implementation of fair workweek regulations (Ananat and Gassman-Pines 2021a).

My ecological framework recognizes that formal regulations are not the only means of governing risk in the scheduling process. As retail stores and other service establishments digitize their operations, vendors of information and communications technology play a greater role in shaping and constraining scheduling practices (O'Neil 2016; Rogers 2020). Managers increasingly rely on specialized software to generate, disseminate, modify, and track work schedules, often integrating information from payroll and point-of-sale systems. Incorporating measures and benchmarks of schedule stability into this software could facilitate voluntary efforts to improve schedule quality or at least identify excess instability. Some vendors already market their scheduling software as a solution to compliance with scheduling regulation. With more public scrutiny and pressure from consumers, this software could become a kind of digital "White Label" that

employers adopt for the sake of their brand reputation, potentially extending scheduling standards beyond the scattered jurisdictions where fair workweek laws are in force (Storrs 2000).

If deployed strategically, digital technology may even check or substitute for managerial discretion in the scheduling process, creating opportunities for cooperative or decentralized coordination of paid work (Schor 2020). An example of this sort of worker-friendly tech is Alia, a nonprofit digital platform that allows domestic workers to collect contributions from various employers in order to fund paid leave and disability insurance (Reyes 2019). Could labor and advocacy organizations develop similar tools to help workers track erratic schedules, swap shifts with coworkers, and enforce their rights to breaks, time off, and premium pay? Given the challenges that regulators and even expert researchers encounter in monitoring and intervening in the scheduling process, it seems prudent to explore more automated and distributed systems for workers to manage scheduling risk.

Recapitulation of Major Claims and Findings

To set up the conclusions drawn in the following section, I first recapitulate the major claims and findings of the dissertation, underscoring my contributions to the sociological literature. I conceive of this work as a study of the origins, functions, and effects of unpredictable and unstable schedules in the US labor market broadly and the retail sector in particular. My study brings to bear a longer historical perspective and more precise causal evidence than prior research on the scheduling process. I frame my inquiry in terms of risk governance and precarity, concepts which integrate and extend prior research in the sociology of work, political economy, and work-life stratification.

I conceive of risk governance as an ecology of social arrangements that anticipate and make provisions for hypothetical occurrences, specifying the rights and obligations of those with a stake in the outcome. Work schedules function as risk governance arrangements for planning and

coordinating work and other activities amid the uncertainty and flux of social life. Schedules arrange the rhythms and contingencies of the labor process, shaping the allocation of time and resources at work, and so too, the products and relations that result. A risk governance perspective helps to clarify differences in the function—as distinct from the form—of stable, unstable, and flexible schedules. Unstable schedules expose workers to risks of idleness and disruption even in the context of ongoing employment on weekdays during daytime hours. An ecological perspective relativizes the standard employment relationship of the mid-twentieth century as merely one among various, historically specific arrangements for governing risks inherent in work under capitalism. In this way, the problem of precarious schedules is recast from one of preserving a particular configuration of stable employment to one of reconfiguring existing governance arrangements to further autonomy, equality, social welfare, and other desired ends.

I conceptualize precarity in the scheduling process as a kind of instability that frustrates the expectations and eludes the control of the workers who experience it. I develop this concept through a critique of efficiency- and power-based theories of schedule determination. Whereas efficient contract theory posits compensating differentials for schedule quality in a competitive labor market, I identify the perishability of labor and specificity of human capital as sources of employer power that may coerce workers to accept uncompensated scheduling risk. Yet employer power does not ensure the resulting schedule arrangements will maximize labor productivity or profits. Employers and their agents may favor short-term gains or cost containment over longer-term investments, satisficing rather than optimizing the production of surplus value in the employment relationship.

My analysis of precarious schedules advances a multidimensional approach to working time arrangements. Rather than reducing schedule variation to a dichotomy of standard versus

nonstandard or a single scale of deviation from the standard workweek, I distinguish multiple dimensions and combinations of variation that may be more or less amenable to workers' expectations and control. In chapter 2, I develop a novel schedule typology based on three dimensions captured with exceptional detail in the NLSY97: volatility in weekly hours, advance notice, and employee control of starting and ending times. I demonstrate that the risk-governing functions and compensation effects of schedule arrangements depend jointly on the extent of variation and locus of control. In chapter 3, I consider the relationship between changes in scheduling practices and the expectations of workers in the US retail sector over the course of the twentieth century. I show that contingent staffing and scheduling practices have a long history, but have become more routine and fraught with the rise of lean retailing and diversification of the retail labor force. In chapter 4, I analyze the effects of just-in-time scheduling on the consistency and productivity of working time in a single retail firm. I present novel measures of consistency with respect to the stability of hours, concentration of shift timing, and commonality of working time from week to week. A multidimensional approach highlights the critical role of schedule control and the relative nature of assessing the efficiency, quality, or precarity of schedule arrangements.

I use this risk-theoretic framework and multidimensional approach to evaluate the thesis that precarious schedules allow employers to realize short-term advantages at the expense of longer-term investment in the employment relationship. I develop a model of work as an option that formalizes and refines the notion of risk shifting from employers to workers through unstable scheduling. Unlike the secular shift from defined-benefit to defined-contribution pensions, whereby employers externalize both downside and upside risks, unstable schedules function as a call option, allowing employers to realize potential gains while avoiding anticipated losses to transacting for available labor. This asymmetric and contingent arrangement grants employers discretion but precludes

mutual commitment to a consistent schedule. I conceive of the trade-off between optionality and commitment in the scheduling process as a reflection of the dual nature of labor as a cost of production and a productive asset. Employers that seek to minimize costs will devalue the productive potential of labor, while those that seek to maximize value-added tend to incur higher unit labor costs.

I evaluate this thesis using various kinds of data and methods that shed light on different aspects of the scheduling process. In chapter 2, I conduct quantitative analyses of the risks and rewards that individual employees report under different schedule arrangements. Although the data I rely on from the NLSY97 are limited to a specific cohort of employees born in the early 1980s and employed in the 2010s, they span a wide range of industries and occupations. Thus, the compensation penalties I identify are indicative of a broader problem with unpredictable and unstable schedules. I find that scheduling risk reduces job satisfaction and beneficial flexibility with no compensating differentials in terms of hourly pay or job retention. Contrary to expectations, these penalties are not attenuated by union coverage or exacerbated by unemployment.

In chapter 3, I draw on historical documents and descriptive statistics to reconstruct the transformation of the US retail labor force from 1900 to 2019. I show how part-time and contingent schedules moved from an exceptional to a routine feature of retail work. However, I argue that precarity is not a direct result of deviation from standard employment but rather a persistent mismatch between workers' expectations and experience of their jobs. This notion of precarity helps explain why retail employers actively recruit workers with lower labor force attachment or other sources of financial support. It also helps explain why many retail workers accept unpredictable schedules and unreliable earnings as normal features of entry-level sales and cashier jobs. Workers

are more likely to experience their jobs as precarious if they expect to remain in them for more than a short period and depend on them for their livelihood.

In chapter 4, I use organizational data from the Stable Scheduling Study to assess the relationship between consistency and productivity in the labor process of twenty-eight clothing stores. I identify a pair of mechanisms whereby more consistent scheduling may contribute to higher productivity via specific skill formation and coworker coordination. I define consistency as the degree of similarity between sets or sequences of work schedules, which I quantify using high-frequency administrative data on the timing and duration of work. I exploit the randomized control design to conduct a mediation analysis of the effects of the Stable Scheduling Treatment on quarterly sales per labor hour and several measures of consistency. However, I find negligible treatment effects on consistency or productivity. Qualitative evidence from manager interviews and employee survey comments help explain these unexpected results, revealing persistent obstacles to stable scheduling—from erratic sales and promotions to preferences for taking turns working more or less desirable shifts. Although the experimental results are inconclusive, they nonetheless shed light on the interrelation between retail operations, scheduling practices, and worker expectations. This research also offers tools for further study and experimentation on schedule consistency, which has received less attention in prior research than nonstandard shifts or volatile hours.

Limitations and Unanswered Questions

By way of conclusion, I discuss the limitations and unanswered questions in my dissertation that I am most eager for future research to address. I highlight three issues that are central to this work but still have not received satisfactory treatment: measurement, timescales, and expectations.

How to measure schedule arrangements?

One immediate area for improvement is the measurement of schedule variation and the formulation of typologies. The present study builds on pathbreaking work by Susan Lambert, Julia Henly, Lonnie Golden, and colleagues to measure schedule variation across multiple dimensions. I follow Lambert and Henly (2014) in analyzing the length of advance notice and number of weekly hours in relation to the locus of schedule control. I extend their critical distinction between instability and flexibility into a more elaborated typology of schedule arrangements that imply different allocations of risk and reward. I define thresholds for short notice and considerable volatility that are informed by existing policy provisions and research on income volatility. However, I do not examine the sensitivity of my results to the choice of thresholds. My nominal approach relaxes the assumption of additivity implicit in the schedule precarity scale developed by Schneider and Harknett (2019). In other work with Susan Lambert, I have discussed the limitations of conventional summary measures of schedule timing and variability (Fugiel and Lambert 2019). Still, it would be useful to directly compare alternative, multidimensional approaches, including nominal typologies, additive scales, and latent variable or factor analysis techniques (Hepburn 2020).

In a more exploratory vein, my dissertation goes beyond the largely survey-based tradition of scheduling research to analyze the consistency of shift timing in administrative data. I adapt measures of sequence similarity to quantify schedule consistency within and between employees, which I term commonality and synchronicity, respectively. Yet this study is only an initial step toward what seems a promising avenue for further research: integrating into scheduling research not only measures of (dis)similarity, but also concepts and techniques from sequence analysis. To my knowledge, few published studies have used panel data on scheduled or actual sequences of work shifts (Kamalahmadi et al. 2021). However, similar data could be obtained from the large and

216

growing number of employers who generate or track employee schedules in a digital format. Business vendors such as Kronos, Deputy, Homebase, and Harri market their scheduling software as tools for employers to comply with fair workweek legislation, which typically includes a record-keeping requirement.

How to evaluate arrangements over multiple timescales?

The issue of measurement connects to a broader question about the timescale for analysis of scheduling or other social processes. By timescale I mean the length or periodization of time, which may be uniform (e.g., minutes, hours, days, weeks), quasi-uniform (months, quarters, years), or variable (job tenure, employment spells, careers). In the present study, I analyze schedule variation at the scale of shifts, weeks, and quarters, mainly for reasons of data availability and reliability. In chapter 2, I combine survey items that specify a reference period (e.g., "In the last month, what is the greatest number of hours you've worked in a week at this job?") and items that do not (e.g., "How many hours do you work in a normal week?"). I also pool responses collected over a ten-month field period irrespective of seasonal variation. In chapter 4, I offer more explicit justification for analyzing consistency and productivity at the quarterly timescale. However, I do not examine whether or how the results of this analysis would change with the choice of another timescale.

The question of timescale is a temporal analogue to the "level of analysis" question more familiar to social scientists. Just as many social phenomena are conventionally understood in terms of a specific level of organization or activity (e.g., individual, household, firm, jurisdiction), many processes occur on a conventional rhythm that implies a certain timescale (Zerubavel 1981). But social rhythms may not follow clear or consistent conventions, or these conventions may not be well suited to the interests of the analyst. A relevant example from my study is labor productivity, which may be analyzed in different units (e.g., sales or value added per hour worked) and on different

timescales. I use administrative data collected in fifteen-minute increments to calculate mean sales per payroll hour at the quarterly timescale, justifying this choice in part by appealing to the convention of reporting business results on a quarterly basis. While the data limitations prevent me from extending this analysis over a much longer timescale, one could argue that annual or multi-year timescales are more appropriate to evaluating productivity growth based on human capital formation. Suffice to say, the choice of timescale may be guided by theory as well as convention or practical considerations.

I believe this is a question that merits more sustained consideration, not only in relation to labor scheduling and productivity, but as a general theoretical and methodological issue in the social sciences. One can easily imagine scenarios in which different conclusions follow from different timescales of analysis. This divergence may be informative about the process under consideration, but it may also be an artifact of the chosen timescale. For instance, a cyclical process may look like a secular trend if the timescale covers only one phase of the cycle. Timescale divergence or artifacts may only become apparent through the accumulation of discrepant results from various studies. Thus, in fields where any given study is likely to restrict analysis of a process to one or another timescale, there may be greater scientific value in a study that views this process on an unconventional timescale than one that hews closely to prior literature. The value of unconventional or orthogonal research is distinct from the value of "reproducibility" championed in positivist science; it is more akin to what Abbott describes as "fullness" of knowledge (Abbott 2001, 23).

Scheduling research exemplifies such an orthogonal advance in the shift from between-employee analysis of usual schedules to within-employee analysis of scheduling variation. This shift has already enriched scholarly understanding by recognizing schedules as dynamic arrangements rather than static categories. Yet a fuller understanding may be gained by analyzing scheduling

218

dynamics at multiple timescales. Some dynamics are common to a wide range of jobs—for example, peak demand for retail and travel around major holidays followed by a lull. Other dynamics are idiosyncratic to specific occupations—for example, the peak season for tax accountants leading up to the filing deadline. These examples point to heterogeneity in what we might call "occupational rhythms" that within-employee analysis will fail to capture if it observes schedule variation only over the course of the past month or at one time of the year. Here again, high-frequency, lengthy panel data from administrative or observational sources would facilitate more systematic analysis of schedule variation across multiple timescales. However, some insight into this question could be gained using available survey data—for instance, by comparing the incidence of schedule variation in the (continuous, year-round) American Time Use Survey with the prevalence of schedule variation in periodic surveys such as the National Longitudinal Survey of Youth 1997 Cohort or the Survey of Household Economic Decision-making.

How do workers form expectations?

My dissertation develops a risk-theoretic framework that challenges efficiency- and power-based theories of schedule arrangements. Rather than assuming that prevailing arrangements serve to maximize worker utility or employer profits, I advance an ecological view of schedule arrangements as the product of heterogeneous actors pursuing multiple objectives under historically specific conditions. I formulate my thesis in terms of a trade-off between optionality and commitment in employment, the relative advantages of which depend on the content and context of the labor process. Despite this ecological perspective, however, my analysis of risk governance in the scheduling process remains rather narrowly focused on economic costs and benefits. As discussed above, this focus reflects my desire to strengthen the social welfare argument for scheduling regulation. But my instrumental evaluation of schedule arrangements may be inadequate to

understanding the aims and motivations of actors in the scheduling process, particularly the workers who accept and even express a preference for unstable arrangements (Besen 2006; Cansoy et al. 2020).

This limitation is most apparent in my account of precarity as chronically frustrated expectations. In chapter 3, I explain the rise of part-time and nonstandard schedule arrangements through a confluence of changes in the retail business and the labor force, including changing demography and expectations of retail workers. However, I rely mainly on indirect evidence of changing expectations in the reasons reported for working part-time, the promise of schedule flexibility in recruitment materials, and increasing shares of mothers, students, and secondary job holders among retail workers. I lack direct evidence that retail workers increasingly expect flexibility in the sense of schedule control or accommodation for nonwork commitments. More fundamentally, I do not explain how workers' expectations form or change over time. While I critique structural accounts of precarity as deviation from an objective standard of job quality (e.g., full-time, daytime, weekday schedules), the subjective expectations I propose as a more proximate standard of reference remain underdeveloped. It is one thing to claim that job quality and precarity are relative concepts; it is quite another to explain how workers actually assess the quality of jobs.

Beyond noting this as a limitation of my dissertation, I can offer only tentative ideas for how to construct a theory of worker expectations. What do workers want, and what are they willing to accept from a job? How much routine or disruption do they think is normal or sustainable? The most promising approach to answering these questions would seem to be ethnography that examines the labor process, interactions, and experiences on the job as well as workers' lives and environment outside of work (Sallaz 2019). Ethnographies of work can document in real time how experiences on the job lead workers to adjust their expectations, contest their working conditions,

leave, or get fired (Hodson 2001). Such research can also delve into processes of recruitment and socialization—the formative influence of family, peers, community, organizations, and media on workers' views of specific jobs or occupations (Willis 1981). In sectors such as retail, workers' job trajectories are often bound up with transitions in labor market or family status, suggesting that a life course perspective may be particularly revealing (Silva 2013).

With a better understanding of how workers form and update expectations of their jobs, it should be possible to clarify the relationship between various subjective and objective aspects of the scheduling process. In the present study, as in much prior literature, these aspects are conflated, for instance, in the way I characterize schedules provided by the employer with a week or less advance notice as "unpredictable." Advance notice is objective and could be observed by a third party, say, when the schedule was printed and posted in the workplace. But unpredictability is subjective in that it implies uncertainty or incongruence between the observed schedule and the worker's expectations. Subjective assessments of the predictability or quality of schedule arrangements can have real consequences for work relations and performance.

Scheduling regulations provide an interesting case of governance arrangements reshaping expectations and perceptions of the scheduling process. Fair workweek legislation is arguably the most significant change in working-time regulations since the Fair Labor Standards Act. Like the protective labor legislation of the Progressive Era that charted a course for the FLSA, fair workweek proposals seek to establish clear and enforceable standards where there is currently only vague or fragmented governance arrangements (Kessler-Harris 1982). Such standards represent an anchor that can steady the gyrations of the labor market without holding it rigidly in place. The introduction of a threshold for overtime or advance notice makes fluctuations that exceed this threshold more salient and potentially contentious than fluctuations that stay within the standard bounds. In the case

of the Seattle Secure Scheduling Ordinance, perhaps the most comprehensive scheduling law in effect, lines are drawn not only between predictable versus unpredictable notice and adequate versus inadequate time between shifts, but also employer-driven versus worker-initiated schedule changes. These provisions make publicly visible forms of control and risk governance that were previously private or obscure. They establish bounds, however weak and contested, that were previously unmarked.

Workers who are treated as disposable and subordinate to the needs of the business may over time come to view this arrangement as inevitable or normal. Scheduling regulation, to the extent that it establishes an alternative standard of reference, creates an opening for workers to raise their expectations and re-evaluate their jobs. Thus, a study of the development and implementation of scheduling regulation could provide a lens for examining the making and remaking of workers' expectations and experiences of their working time.

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Appendix A. Scheduling Items in the National Longitudinal Survey of Youth 1997 Cohort Questionnaire

Number of hours

How many hours do you work for [EMPLOYER] in a normal week? Please include all hours you work whether at your normal work site, at home, or in some other location. [YEMP-98402]

In the last month, what is the *greatest number of hours* you've worked in a week at this job? Please consider all hours, including any extra hours, overtime, work you did at home, and so forth. [YEMP-WS1]

In the last month, what is the *fewest number of hours* you've worked in a week at this job? Please do not include weeks in which you missed work because of illness or vacation. [YEMP-WS2]

Advance notice

How far in advance do you usually know what days and hours you will need to work? [YEMP-WS3]

- One week or less
- Between 1 and 2 weeks
- Between 3 and 4 weeks
- 4 weeks or more

Schedule control

Which of the following statements best describes how your working hours are decided? By working

hours we mean the time you start and finish work, and not the total hours you work per week or

month. [YEMP-WS4, SHOWCARD DDD]

- Starting and finishing times are decided by my employer and I cannot change them on my own;
- Starting and finishing times are decided by my employer but with my input;
- I can decide the time I start and finish work, within certain limits;
- I am entirely free to decide when I start and finish work.
- When I start and finish work depends on things outside of my control and outside of my employer's control

Beneficial flexibility

I'm going to refer to a list of benefits which employers sometimes make available to their employees.

At this time, which of the benefits on this list would it be possible for you to receive as part of your

job with [EMPLOYER]? [YEMP-100300, SHOWCARD O]

- A flexible work schedule

Appendix B. Characteristics of NLSY97 Analytic Sample

Variable	Mean	Std. dev.	Min.	P25	P50	P75	Max.
Age in years	32.1	2.7	26	30	32	34	38
Female	0.50	0.50	0	0	0	1	1
Black	0.15	0.36	0	0	0	0	1
Hispanic	0.13	0.33	0	0	0	0	1
Asian	0.02	0.15	0	0	0	0	1
Married	0.48	0.50	0	0	0	1	1
Cohabiting spouse/partner	0.63	0.48	0	0	1	1	1
No. of biological children	1.7	1.1	0	1	2	2	7
Any resident child under 6	0.36	0.48	0	0	0	1	1
Urban residence	0.81	0.40	0	1	1	1	1
High school diploma or less	0.53	0.50	0	0	1	1	1
4-year college degree	0.38	0.49	0	0	0	1	1
Current student	0.08	0.27	0	0	0	0	1
Years of work experience	10.0	3.7	0	8	10	13	19
No. jobs held since age 20	6.7	3.7	1	4	6	9	18
Multiple current jobs	0.08	0.27	0	0	0	0	1
Tenure of main job in weeks	229	201	2	64	169	351	808
Hourly wage of main job ($)	21.23	13.87	0.01	12.00	17.50	26.00	90.00
Total hourly pay ($)	23.17	15.85	2.31	13.11	18.87	27.90	106.84
No. employees at workplace	483	1,365	1	15	60	300	10,000
Multiple establishments	0.68	0.47	0	0	1	1	1
Union coverage	0.14	0.35	0	0	0	0	1
Hourly pay status	0.50	0.50	0	0	0	1	1
Full-time hours (≥ 35 / wk.)	0.83	0.38	0	1	1	1	1
Normal weekly hours	39.7	10.6	1	38	40	40	75
Any usual overtime pay	0.36	0.48	0	0	0	1	1
Nonstandard shift timing	0.28	0.45	0	0	0	1	1
Nontraditional contract	0.04	0.20	0	0	0	0	1
Any paid time off	0.81	0.39	0	1	1	1	1
Days of PTO per year	15.7	17.4	0	5	14	21	120
Medical benefits	0.79	0.41	0	1	1	1	1
Flexible schedule benefit	0.49	0.50	0	0	0	1	1
Paid parental leave	0.43	0.50	0	0	0	1	1
Childcare benefits	0.09	0.29	0	0	0	0	1
Job satisfaction (1=highest)	1.93	0.96	1	1	2	3	5
Local unemployment rate	5.9	2.1	–	4.3	5.4	7.1	–
Number of person-year observations in sample	3.0	1.0	1.0	2.0	3.0	4.0	4.0

Note: Statistics estimated using base weight and correction for survey design. Pooled sample includes all responses from rounds 15–18 for which there is valid data on at least one work schedule item (YEMP-WS) and normal hours (CV_HRS_PER_WEEK) for the main employee-type job (N = 15,964). Minimum and maximum unemployment rates suppressed to protect confidentiality.

Appendix C. Supplemental Regression Coefficient Estimates

This appendix reports supplemental regression coefficient estimates for the models of labor compensation described in chapter 2. For instance, table C1 displays estimates from three fixed-effects models of the natural logarithm of hourly pay. Model 1 only includes the schedule indicators and interactions of interest, model 2 adds the reduced set of control variables, and model 3 adds the full set of controls including items with a higher share of missing values (e.g., number of employees at the workplace). I indicate with a "Y" the additional sets of fixed effects included in the model, but do not report the estimates to conserve space. Given the multiple interaction terms and fixed effects, it is difficult to interpret the individual coefficients from these models. This is why I only report the marginal effects at the mean (MEM) in the body of the chapter.

Table C1. Fixed-effects OLS estimates of log hourly pay

Ln(pay)	Model 1 β	(s.e.)	Model 2 β	(s.e.)	Model 3 β	(s.e.)
Short notice	−0.064	(0.036)	−0.022	(0.034)	−0.018	(0.039)
Volatile hours	0.040	(0.021)	0.012	(0.020)	0.022	(0.020)
Short*Volatile	−0.064	(0.049)	−0.043	(0.043)	−0.013	(0.050)
Outside control	−0.035*	(0.017)	−0.009	(0.016)	−0.006	(0.018)
Outside*Volatile	−0.028	(0.024)	−0.023	(0.023)	−0.040	(0.023)
Outside*Short	−0.021	(0.039)	−0.010	(0.037)	0.013	(0.042)
Outside*Volatile*Short	0.084	(0.052)	0.056	(0.047)	0.018	(0.053)
Age in years			−0.019	(0.017)	−0.014	(0.019)
Age in years squared			−0.001*	(0.001)	−0.001	(0.001)
HS or less education			−0.037	(0.051)	−0.047	(0.052)
BA or more education			0.064	(0.052)	0.112	(0.061)
Student			−0.035	(0.018)	−0.005	(0.021)
Married			0.039*	(0.015)	0.040*	(0.019)
Child < 6 years old			0.032*	(0.014)	0.026	(0.016)
Any biological child			0.007	(0.010)	0.012	(0.011)
Urban residence			0.021	(0.018)	0.018	(0.021)
√(Years of experience)			0.199***	(0.058)	0.227**	(0.080)
Hourly pay status			−0.051***	(0.013)	−0.043**	(0.014)
Full-time hours			0.020	(0.018)	−0.034	(0.022)
Any overtime pay			0.159***	(0.011)	0.147***	(0.014)
Medical benefits					0.076***	(0.021)
Paid parental leave					0.019	(0.013)
√(Days of PTO)					0.012**	(0.004)
Nonstandard shift					0.005	(0.017)
Union coverage					0.028	(0.025)
Multiple locations					0.011	(0.018)
Ln(workplace size)					0.000	(0.006)
Industry			Y		Y	
Occupation			Y		Y	
Region			Y		Y	
Year			Y		Y	
R-squared	0.013		0.237		0.258	
N observations	12,487		11,508		8,740	
N employees	5,884		5,639		4,710	

Note: Models estimated using base weight. Clustered robust standard errors in parentheses. Estimates of intercept and fixed effects not shown. *** p<0.001, ** p<0.01, * p<0.05

Table C2. Fixed-effects LPM estimates of job retention

Pr(retention at t+1)	Model 1		Model 2		Model 3	
	β	(s.e.)	β	(s.e.)	β	(s.e.)
Short notice	−0.016	(0.046)	0.007	(0.051)	0.051	(0.053)
Volatile hours	0.010	(0.033)	0.033	(0.037)	0.060	(0.041)
Short*Volatile	0.003	(0.064)	−0.018	(0.069)	−0.120	(0.074)
Outside control	−0.015	(0.030)	−0.012	(0.032)	−0.015	(0.036)
Outside*Volatile	−0.005	(0.039)	−0.019	(0.042)	−0.055	(0.047)
Outside*Short	−0.072	(0.054)	−0.082	(0.059)	−0.113	(0.061)
Outside*Volatile*Short	−0.006	(0.074)	0.029	(0.080)	0.079	(0.085)
Age in years$_{t+1}$			−0.039	(0.028)	−0.051	(0.031)
Age in years$^2_{t+1}$			−0.002	(0.001)	−0.001	(0.002)
HS or less education$_{t+1}$			0.108	(0.109)	0.060	(0.113)
BA or more$_{t+1}$			0.036	(0.120)	−0.009	(0.115)
Student$_{t+1}$			0.045	(0.039)	0.014	(0.044)
Married$_{t+1}$			0.018	(0.034)	0.012	(0.035)
Child < 6 years old$_{t+1}$			0.036	(0.027)	0.035	(0.030)
Any biological child$_{t+1}$			−0.011	(0.021)	−0.022	(0.023)
Urban residence			0.010	(0.045)	0.014	(0.049)
√(Years of experience)			−0.220*	(0.107)	−0.222	(0.114)
Hourly pay status			−0.034	(0.025)	−0.042	(0.030)
Full-time hours			0.076*	(0.032)	0.001	(0.040)
Any overtime pay			−0.040	(0.021)	−0.029	(0.024)
Medical benefits					0.005	(0.037)
Paid parental leave					0.061**	(0.024)
√(Days of PTO)					0.007	(0.006)
Nonstandard shift					−0.046	(0.031)
Union coverage					−0.090	(0.053)
Multiple locations					0.004	(0.031)
Ln(workplace size)					0.031**	(0.010)
Industry			Y		Y	
Occupation			Y		Y	
Region$_{t+1}$			Y		Y	
Year$_{t+1}$			Y		Y	
R-squared	0.006		0.038		0.062	
N observations	8,166		7,504		5,858	
N employees	4,219		4,033		3,401	

Note: Models estimated using base weight. Clustered robust standard errors in parentheses. Estimates of intercept and fixed effects not shown. *** p<0.001, ** p<0.01, * p<0.05

Table C3. Fixed-effects LPM estimates of beneficial flexibility

Pr(beneficial flexibility)	Model 1		Model 2		Model 3	
	β	(s.e.)	β	(s.e.)	β	(s.e.)
Short notice	−0.008	(0.042)	−0.007	(0.044)	−0.054	(0.047)
Volatile hours	0.049*	(0.025)	0.040	(0.027)	0.028	(0.029)
Short*Volatile	−0.031	(0.055)	−0.022	(0.058)	0.029	(0.062)
Outside control	−0.208***	(0.023)	−0.189***	(0.025)	−0.188***	(0.028)
Outside*Volatile	0.009	(0.030)	0.006	(0.032)	0.015	(0.035)
Outside*Short	−0.005	(0.048)	0.019	(0.050)	0.065	(0.053)
Outside*Volatile*Short	0.075	(0.063)	0.059	(0.066)	0.021	(0.070)
Age in years			0.007	(0.023)	−0.008	(0.025)
Age in years squared			−0.000	(0.001)	−0.000	(0.001)
HS or less education			0.080	(0.074)	0.107	(0.082)
BA or more education			−0.043	(0.086)	−0.005	(0.098)
Student			0.011	(0.024)	0.026	(0.025)
Married			0.021	(0.025)	0.023	(0.027)
Child < 6 years old			−0.039	(0.021)	−0.033	(0.023)
Any biological child			0.020	(0.017)	0.017	(0.018)
Urban residence			0.009	(0.029)	0.019	(0.029)
√(Years of experience)			−0.085	(0.070)	−0.094	(0.074)
Hourly pay status			0.019	(0.019)	0.009	(0.021)
Full-time hours			−0.002	(0.027)	−0.007	(0.030)
Any overtime pay			0.033	(0.017)	0.031	(0.019)
Medical benefits					0.001	(0.030)
Paid parental leave					0.088***	(0.019)
√(Days of PTO)					0.006	(0.005)
Nonstandard shift					0.027	(0.024)
Union coverage					−0.030	(0.033)
Multiple locations					0.013	(0.022)
Ln(workplace size)					−0.005	(0.006)
Industry			Y		Y	
Occupation			Y		Y	
Region			Y		Y	
Year			Y		Y	
R-squared	0.032		0.077		0.081	
N observations	11,401		10,412		9,099	
N employees	5,525		5,261		4,815	

Note: Models estimated using base weight. Clustered robust standard errors in parentheses. Estimates of intercept and fixed effects not shown. *** p<0.001, ** p<0.01, * p<0.05

Table C4. Fixed-effects LPM estimates of highest level of job satisfaction

Pr(like job very much)	Model 1 β	Model 1 (s.e.)	Model 2 β	Model 2 (s.e.)	Model 3 β	Model 3 (s.e.)
Short notice	−0.037	(0.039)	−0.055	(0.040)	−0.046	(0.043)
Volatile hours	−0.016	(0.026)	0.001	(0.028)	0.014	(0.030)
Short*Volatile	0.022	(0.052)	0.046	(0.054)	0.026	(0.058)
Outside control	−0.094***	(0.023)	−0.088***	(0.026)	−0.084**	(0.027)
Outside*Volatile	0.045	(0.031)	0.029	(0.033)	0.020	(0.035)
Outside*Short	−0.008	(0.046)	0.016	(0.047)	0.009	(0.051)
Outside*Volatile*Short	−0.045	(0.061)	−0.068	(0.063)	−0.082	(0.068)
Age in years			0.025	(0.022)	0.033	(0.024)
Age in years squared			0.001	(0.001)	0.001	(0.001)
HS or less education			−0.091	(0.070)	−0.113	(0.078)
BA or more education			−0.098	(0.086)	−0.092	(0.098)
Student			−0.013	(0.026)	−0.016	(0.029)
Married			−0.001	(0.026)	−0.001	(0.027)
Child < 6 years old			−0.005	(0.020)	0.005	(0.022)
Any biological child			0.012	(0.015)	0.003	(0.016)
Urban residence			−0.005	(0.026)	−0.023	(0.028)
√(Years of experience)			−0.225***	(0.066)	−0.265***	(0.079)
Hourly pay status			0.007	(0.019)	0.006	(0.021)
Full-time hours			0.009	(0.026)	−0.014	(0.029)
Any overtime pay			0.008	(0.017)	0.003	(0.019)
Medical benefits					−0.026	(0.026)
Paid parental leave					0.047*	(0.019)
√(Days of PTO)					0.009	(0.005)
Nonstandard shift					0.037	(0.023)
Union coverage					0.027	(0.037)
Multiple locations					−0.003	(0.021)
Ln(workplace size)					−0.002	(0.007)
Industry			Y		Y	
Occupation			Y		Y	
Region			Y		Y	
Year			Y		Y	
R-squared	0.008		0.030		0.041	
N observations	11,415		10,425		9,101	
N employees	5,533		5,270		4,817	

Note: Models estimated using base weight. Clustered robust standard errors in parentheses. Estimates of intercept and fixed effects not shown. *** p<0.001, ** p<0.01, * p<0.05

Appendix D. Historical Tables and Figures

Table D1. Sex and marital status of retail salespersons and cashiers

| | **Women** | | | | |
| | Marital status | | | Overall | |
Year	% Single	% Married	% Separated / Divorced	% of total	Number (1,000s)
1900	88	7	5	20	205
1910	80	13	7	27	380
1920	68	20	12	32	546
1930	54	33	13	29	770
1940	48	41	12	32	830
1950	28	55	17	41	1,519
1960	16	73	10	60	3,722
1970	24	65	11	61	4,426
1980	35	53	12	62	5,246
1990	42	46	13	61	6,347
2000	44	42	14	59	6,830
2010	51	34	15	58	7,104
2018	55	32	13	57	6,453

| | **Men** | | | | |
| | Marital status | | | Overall | |
Year	% Single	% Married	% Separated / Divorced	% of total	Number (1,000s)
1900	55	43	2	80	799
1910	47	50	3	73	1,025
1920	40	56	3	68	1,165
1930	34	62	4	71	1,868
1940	31	66	3	68	1,770
1950	20	76	4	59	2,148
1960	22	74	4	40	2,458
1970	25	70	5	39	2,845
1980	33	60	8	38	3,161
1990	39	52	9	39	3,990
2000	42	48	10	41	4,762

Source: IPUMS USA Decennial Census and American Community Survey data.

Table D2. Age and nonwork roles of retail salespersons and cashiers

| Year | Age in years | | | | | Parent of child < 5 | Student |
	% 16-19	% 20-24	% 25-34	% 35-44	% 45-65	%	%
1900	17	25	30	16	12	12	
1910	16	22	29	18	15	13	4
1920	13	19	30	20	17	13	3
1930	10	18	29	22	20	13	3
1940	7	18	29	22	23	12	2
1950	9	13	26	24	29	18	2
1960	13	11	21	23	32	24	11
1970	16	15	18	17	34	18	18
1980	20	19	22	14	26	15	23
1990	20	17	24	17	22	16	27
2000	21	17	19	19	25	15	28
2010	14	21	19	15	30	13	26
2018	16	19	21	14	29	11	26

Source: IPUMS USA Decennial Census and American Community Survey (ACS) data.

Table D3. Race, ethnicity, and nativity of retail salespersons and cashiers

Year	% US born White	% Foreign born White	% Black	% Hispanic	% Asian
1900	84	14	1	0	0
1910	84	14	0	0	0
1920	86	12	1	1	0
1930	86	11	1	1	0
1940	89	9	1	1	0
1950	90	6	2	1	0
1960	91	5	2	2	0
1970	88	4	4	3	1
1980	84	3	6	5	1
1990	77	3	10	7	3
2000	68	3	12	11	4
2010	63	3	13	15	5
2018	59	3	14	18	6

Source: IPUMS USA Decennial Census and ACS data.

Table D4. Weekly work hours of retail salespersons and cashiers

Year	Number of hours				Workers in hours interval					
	Mean	P25	Median	P75	% 1-14	% 15-29	% 30-34	% 35-40	% 41-48	% 49+
1940	46.2	40	48	50	3	4	3	23	37	30
1950	43.1	40	42	48	4	7	3	35	28	23
1960					9	11	4	36	21	20
1970					8	15	7	40	15	15
1980	34.1	23	40	40	9	24	8	39	8	12
1990	34.4	22	40	40	8	25	9	36	8	14
2000	35.2	25	40	40	6	23	10	40	7	15
2010	33.4	23	36	40	8	25	11	38	5	12
2018	33.4	24	38	40	8	26	11	39	6	11

Source: IPUMS USA Decennial Census and ACS data.

Table D5. Schedule status by sex of retail salespersons and cashiers

	Women		Men	
Year	% Part-time	% Full-time	% Part-time	% Full-time
1940	18	82	6	94
1950	24	76	7	93
1960	38	62	12	88
1970	46	54	15	85
1980	56	44	19	81
1990	56	44	23	77
2000	50	50	25	75
2010	56	44	31	69
2018	55	45	31	69

Source: IPUMS USA Decennial Census and ACS data.

Table D6. Educational attainment of retail salespersons and cashiers

Year	% Less than high school	% High school	% Some college	% Bachelors or higher
1940	49	36	10	5
1950	45	34	15	6
1960	46	33	16	5
1970	36	36	22	6
1980	26	35	29	11
1990	19	35	33	14
2000	19	32	33	15
2010	13	29	39	19
2018	13	29	37	21

Source: IPUMS USA Decennial Census and ACS data.

Table D7. Earnings of retail salespersons and cashiers relative to family income

	Ratio of individual earnings to family income			
Year	% Less than 0.25	% At least 0.25, under 0.5	% At least 0.5, under 0.75	% At least 0.75
1960	57	13	9	21
1970	55	14	10	21
1980	54	14	11	21
1990	53	15	11	21
2000	49	15	11	24
2010	48	15	11	26
2018	47	16	11	26

Source: IPUMS USA Decennial Census and ACS data.

Table D8. Family income of retail salespersons and cashiers relative to poverty threshold

	Ratio of family income to official poverty threshold			
Year	% Poor (< 1)	% Near poor (1-1.99)	% Moderate income (2-3.99)	% High income (≥ 4)
1960	10	30	44	16
1970	6	16	45	32
1980	8	15	39	39
1990	11	16	34	39
2000	13	17	31	39
2010	18	19	30	34
2018	15	18	29	38

Source: IPUMS USA Decennial Census and ACS data.

Table D9. Actual and expected job tenure of retail salespersons and cashiers

	Current job tenure in years			
Period or year	Mean	P25	Median	P75
1983-1987	4.26	0.58	2	5
1996	3.81	0.5	1.5	5
2000-2008	4.09	0.5	2	5
2010-2018	4.63	0.67	2	6
	Expected additional years of job tenure			
Period	Mean	P25	Median	P75
1995-1997	3.64	0.25	1	3
1999-2001	3.59	0.33	1	4
2005-2017	4.23	0.5	2	4

Source: IPUMS data from Job Tenure and Contingent Worker Supplements to the Current Population Survey.

Table D10. Schedule status and reason for any part-time work of retail salespersons and cashiers

Period	Usually full-time			Usually part-time					
	% No weeks part-time in last year	% PT week for economic reasons	% PT week for non-economic reasons	% Nature of job	% Slack work or business conditions	% Family, child care, health limitation	% School or training	% Don't want FT work	% Other reasons
1962-1969	65			4	1	2		7	22
1970-1979	62	0	0	5	2	1		14	16
1980-1989	59	0	1	7	3	1		22	7
1990-1999	55	1	2	6	3	6	11	10	7
2000-2009	55	1	2	6	3	8	16	2	7
2010-2019	52	1	2	9	5	7	15	2	7

Source: IPUMS data from Annual Social and Economic Supplement to the Current Population Survey (CPS).

Table D11. Schedule characteristics of retail salespersons and cashiers

	Shift type				Other schedule characteristics			
Period	% Regular day	% Regular evening or night	% Irregular or rotating	% Split or other	% Flexible timing (w/ worker control)	% Variable timing or hours	% Unstable timing (w/o worker control)	% On call (BLS def.)
1989-1998	68	12	17	3	24	7	5	1
1999-2004	71	15	13	1	37	28	18	1
2005-2017								1

Source: IPUMS data from Work Schedule and Contingent Worker Supplements to the CPS.

Table D12. Downward labor market mobility of retail salespersons and cashiers versus non-retail employees

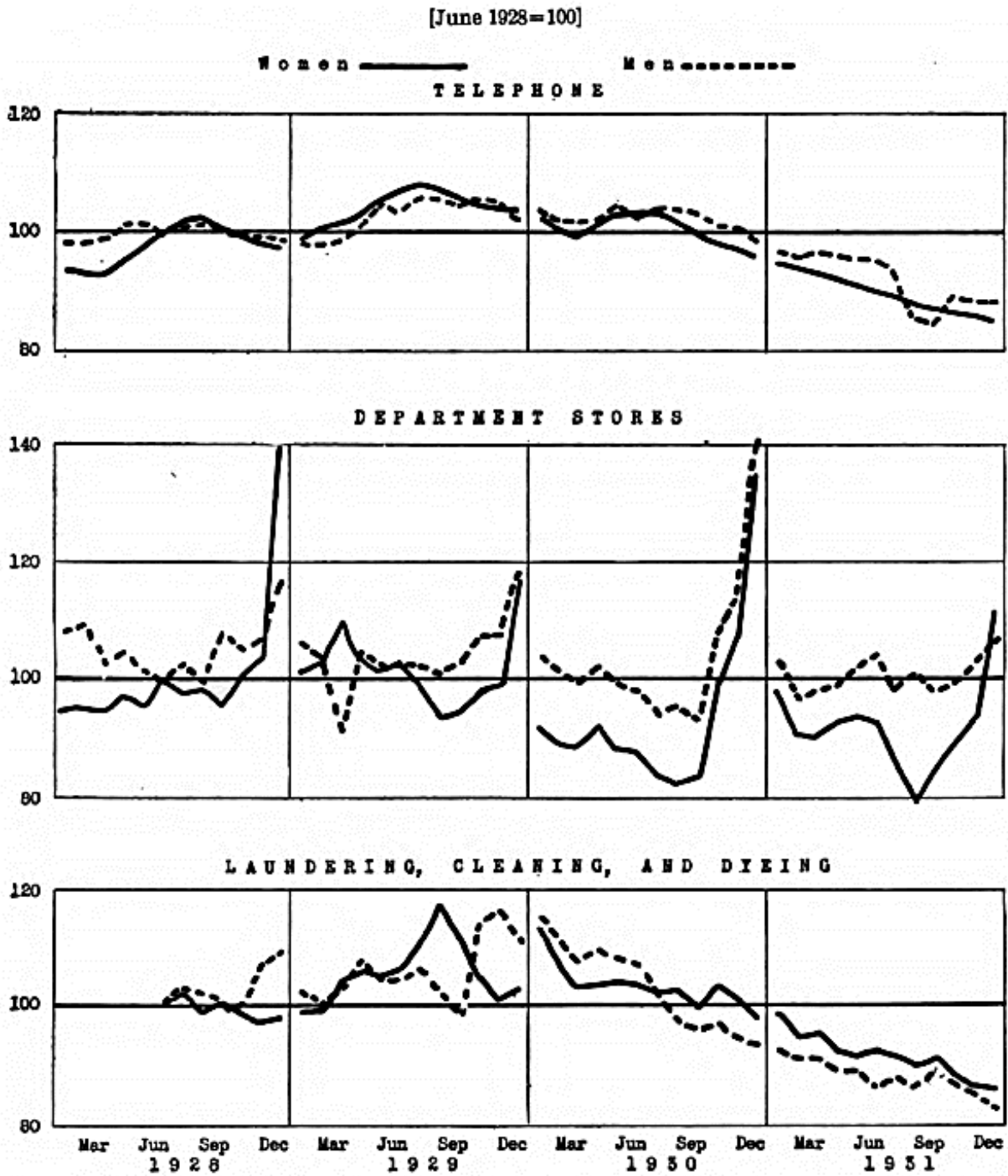|	Stopped retail job, started non-retail job			Stopped non-retail job, started retail job			Stopped and started non-retail jobs		
Period	% Earn less	% Lost health insurance	% Lost FT hours for econ. reasons	% Earn less	% Lost health insurance	% Lost FT hours for econ. reasons	% Earn less	% Lost health insurance	% Lost FT hours for econ. reasons
1984-1989	39.1	12.8	7.2	57.1	18.7	13.0	43.2	20.1	5.3
1990-1999	37.8	10.3	4.5	58.2	15.3	11.4	43.4	15.2	4.9
2000-2008	40.6	9.4	3.6	59.8	14.2	10.6	45.9	15.5	4.1
2010-2018	41.1	11.2	5.8	62.6	17.5	11.0	46.8	16.7	5.1

Source: IPUMS data from Displaced Worker Supplement to the CPS.

Figure D1. Retailer advertising flexible schedules to prospective workers

Source: Twitter account of Fairfield, CT Home Depot store ([@hdfairfield](#)), January 23, 2019. Used with permission of store management.

Figure D2. Index of employment in select service industries in Illinois by sex, 1928–31

[June 1928=100]

Women ————   Men ━ ━ ━ ━

T E L E P H O N E

D E P A R T M E N T   S T O R E S

L A U N D E R I N G,   C L E A N I N G,   A N D   D Y E I N G

| Mar | Jun | Sep | Dec | Mar | Jun | Sep | Dec | Mar | Jun | Sep | Dec | Mar | Jun | Sep | Dec |
| 1 9 2 8 | | | | 1 9 2 9 | | | | 1 9 5 0 | | | | 1 9 5 1 | | | |

Source: Chart 9 in Pidgeon (1933, 66).

262

Figure D3. Secular and cyclical trends in part-time employment among all non-agricultural employees
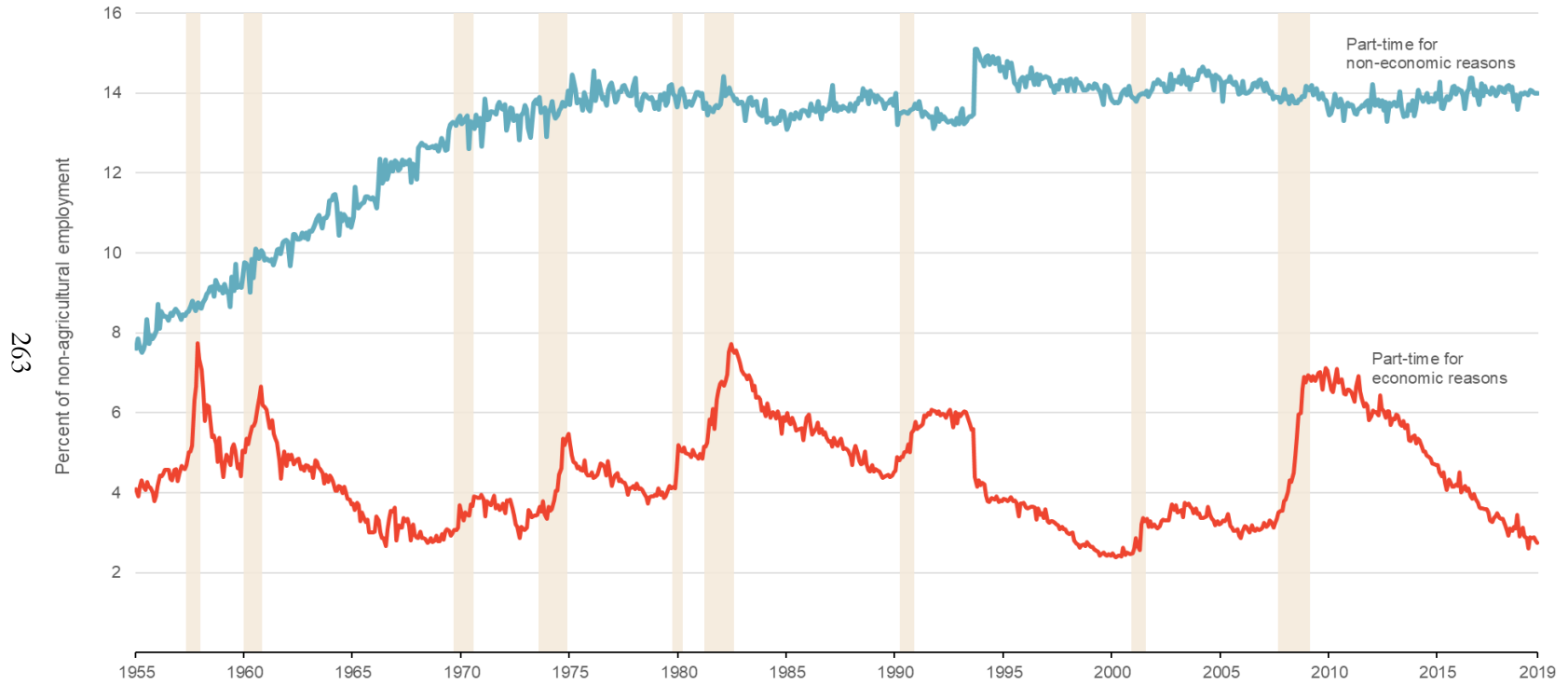
Note: Shaded areas indicate recessions according to NBER. Data obtained from Federal Reserve Bank of St. Louis FRED site (fred.stlouisfed.org).