Workplace Change in an Age of Insecurity: Evidence from a U.S. Automaker

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ABSTRACT

What accounts for the low adoption of high performance work practices in the U.S.? This study explores a political explanation: their survival depends on the cooperation of different social actors in organizations. Through a qualitative interview study of two underused work reforms at a U.S. auto plant, I explore how interpretations of workplace change vary across interest groups, with the goal of helping to explain what limits diffusion broadly. The first reform permits certain skilled employees, as team members, to cross job boundaries. The second reform redistributes job tasks from skilled to production employees. In insecure contexts, the concepts of opportunity and threat are a useful framework for understanding actor responses to change. While teams were most commonly viewed as opportunities, interpretations of task redistributions were mixed. While non-skilled national union representatives viewed them as an opportunity for the majority production workforce to share in the gains of technological change, skilled representatives viewed them as threats, and resisted them. Adoption of both reforms seemed to depend on endorsement of local skilled leadership. This study contributes to the small literature that uses a political framework to understand implementation of work organization changes. Further, it provides insight into other forms of insecurity informing actor responses to change—not job insecurity per se, but longer-term labor market insecurity rooted in declining occupational status. This has implications for which complementary measures might spark greater workforce commitment in firms trying to advance work reforms. Further, this study highlights enduring sources of leverage and occupation-based conflict within traditional U.S. labor unions today. Finally, it contributes to future of work discussions by highlighting the bureaucratic structures and group interests with which firms adopting new technologies contend, suggesting that job or skill outcomes of technological change are not fixed.

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I am deeply indebted to the employees of AutoCo, and the AutoCo union, who took time out of their workdays to speak with me about their jobs and careers, the people they work with, the problems they deal with, auto production, skills training, and more. I am especially indebted to the individuals, one in particular, who facilitated my access. I thank you for your help. I am also grateful to the employees who provided extended tours of the Midwest plant. Vehicle production is complex. My interviews often featured lengthy discussions of production tools and processes. Often interviewees would supplement accounts with hand gestures to convey interdependent shapes and movement. I was humbled by the expertise, experience, and commitment of everyone I spoke with for this research. To these individuals, I hope this research provides insight that helps you with some aspect of your work, however small.

INTRODUCTION

During the 1980s and 1990s, U.S. workplaces started to change. In response to heightened global competition, companies introduced new forms of work organization, as part of a model of workplace transformation called high performance work systems. Core features are: greater frontline involvement in work decisions; training investments; and HR incentives to increase worker effort (Appelbaum and Batt 1994, MacDuffie and Kochan 1995, Osterman 1995, Pfeffer 2007, Appelbaum et al. 2000). In spite of evidence that these practices improve quality and productivity (e.g., Appelbaum et al. 2000, Combs et al. 2006, Ichniowski et al. 1997, Kochan and Osterman 1994) U.S. firm adoption has been low, or piecemeal in fashion (Appelbaum and Batt 1994, Ichniowski et al., 1996, Osterman 1994, 2000, Pfeffer 2007).

What accounts for this low adoption? This study examines one possible explanation: the introduction and persistence of new work practices depend on the cooperation of different sets of social actors in organizations.

High performance work reforms, such as teams or fluid job boundaries, commonly alter divisions of labor, affecting the work of multiple groups. How groups interpret and respond to such reforms will depend on their position, division, or occupation (Batt 2004), and the contexts surrounding implementation (Appelbaum et al. 2000, Hunter et al. 2002). If new work practices fail to meet group interests, distinguished by position, division, or occupation, and informed by heightened insecurity or precarity, then actors have incentives to stand in their way.

The reportedly low adoption of high performance work reforms, thus, may partly reflect what Osterman (2011) calls "political struggles" between groups. This means that in organizations, stalled work reforms, rather than resulting from a rational performance assessment by top managers, instead may reflect blocking efforts or inaction by influential opponents. Yet with notable exceptions (e.g., Batt 2004), research in the considerable high performance literature rarely applies a political lens that links the confluence of group interests, and the increasingly insecure contexts that frame the choices of people in organizations, to outcomes.

Through a qualitative interview study of two underused work reforms at a U.S. automaker called AutoCo, I explore how interpretations of workplace change vary across critical interest groups in organizations, with the goal of helping to explain what limits adoption. The first work reform permits certain core skilled employees, as part of teams, to cross traditionally strict job boundaries. The second reform redistributes certain maintenance tasks from core skilled to production employees. In insecure contexts, the concepts of *opportunity* and *threat* are a useful analytic framework for understanding actor responses to change. Following a decade of record-high sales levels, the Great Recession triggered the steepest U.S. auto production and sales declines of the post-war era (Klier and Rubenstein 2013). This led to paradigm-shifting union concessions, job cuts, and restructuring (Chen 2015, Klier and Rubenstein 2013). The auto industry has been profitable since then; but there were signs that another downturn was imminent. I theorize that support for the two reforms will depend on how actors perceive them either advancing their interests, or interests they represent (opportunity), or subverting them somehow (threat).

Findings show meaningful variation in interpretations, within and across core interest groups. Teams were viewed most frequently as opportunities across groups. While task redistributions from skilled to production employees were viewed by non-skilled national union representatives as an opportunity for the union's majority production workforce to share in the gains of technological change, skilled union representatives across organizational tiers viewed them as threats, and resisted them. Ultimately, adoption of both reforms seemed to depend on the endorsement of local skilled union leadership.

Through examination of interpretations of two work reforms at a U.S. automaker, and their variation across critical interest groups, this study contributes insight into group responses to workplace change and to factors impeding broader adoption. Further, through accounts of resistance from a historically powerful and tradition-steeped constituency of the U.S. auto industry and labor movement, this paper contributes insight into other sources of insecurity informing actor responses to workplace change—not job insecurity per se, but insecurity rooted in fragile or declining occupational status. This has implications for which complementary measures might induce greater employee commitment in firms trying to adopt work organization changes, with findings pointing to meaningful investment in employee skill development, versus strict employment security measures, as one way forward.

Further, this study contributes to our understanding of how traditional U.S. labor unions fare today, highlighting points of bargaining leverage amid their overall decline and the persistence of conflict along occupational lines (Zieger 1995). Finally, this paper's exploration of how different groups interpret task redistributions on the shop floor contributes to the sociology of occupations and professions literature, which documents how occupational jurisdictions are contested at the institutional level (Abbott 1988), and how closure tactics contribute to the unequal distribution of occupational rewards (Weeden 2002), but features relatively fewer investigations of workplace-level interactions that have the potential to shift long-standing structures (Bechky 2003).

Following a discussion of existing explanations of limited adoption of work reforms characteristic of the high performance model and the value of a political lens, I describe my analytic framework structured around opportunities and threats, and review empirical evidence on the consequences of work organization changes that underpin my hypotheses and analysis of actor interpretations. Next, I describe my data and research methods, the empirical setting, and the work reforms under study. Then I summarize my findings. I conclude with a discussion of this paper's contributions, suggestions for further research, and practical implications for organizations.

PRIOR LITERATURE

What are high performance work reforms?

Over the 1980s and 1990s, facing expanded global competition, U.S. firms, especially manufacturers, adopted more participatory work practices, as part of a workplace transformation model called high performance work systems (HPWS), with benefits said to accrue to workers as a secondary outcome of strengthened performance (Osterman 2011). Common practices include

greater core workforce involvement in work decisions, such as through teams, job rotation, and information sharing (MacDuffie and Kochan 1995: 151); skills training; and complementary HR incentives to deepen worker commitment (e.g., MacDuffie and Kochan 1995, Brown et al. 1991, Osterman 1995, Pfeffer 2007, Appelbaum et al. 2000, Batt 2002, Ichniowski et al. 1996, Appelbaum and Batt 1994). In unionized firms, associated changes include broader job categories, reduced reliance on seniority, and enhanced communication forums as a grievance alternative (e.g., Adler 1993, Ichniowski 1992, Cutcher-Gershenfeld 1991).

Scholars lack recent large-scale survey data (Handel and Levine 2006); available evidence, however, suggests that following an expansion in the early-1990s, practices characteristic of the high performance model never reached more than a large minority of firms (e.g., Appelbaum and Batt 1994: chapter 5; Leigh and Gifford 1999, Gittleman et al. 1998, Osterman 1994, Osterman 2000, MacDuffie 1995, Ichniowski et al. 1997, Black et al. 2004).[1] For example, a 1997 cross-industry establishment survey found that 38.3 percent had at least two practices, with at least half of core employees involved in each, up from 24.6 percent five years earlier (Osterman 2000). Most establishments with two or more practices in 1992 had them in 1997, with exception of teams (Osterman 2000: 187).[2] After this period, adoption rates flattened or declined (O'Toole & Lawler 2006, Shaw 2006, Osterman 2011).

What accounts for low adoption of high performance work reforms?

Work reforms are usually part of a strategic transformation, requiring significant resource investments by multiple stakeholders, especially up front (Appelbaum and Batt 1994). In the absence of a supportive "institutional framework" (Appelbaum and Batt 1994: 155), a key question is whether returns on investments are sufficient to justify the effort, given research showing mixed profitability outcomes (e.g., Godard 2004).

Further, the benefits of work reforms may be difficult to perceive if not given enough time to mature (Pil and MacDuffie 1996). Similarly, if work reforms perform best when bundled with complementary measures (e.g., Cooke 1994, Katz et al. 1987)—for instance, the returns of teams are likely to be greater if participants are trained and paid to rotate new tasks (Shaw 2006)—then organizations testing them individually may decide to revert back to traditional arrangements after disappointing initial returns.

While explanations emphasizing operational barriers to change are important, they overlook actions and decisions by "self-interested" actors that may hinder adoption (Batt 2004). This paper considers an alternative, though complementary, political explanation: the introduction and persistence of work reforms depend on the cooperation of self-interested actors within organizations. High performance work practices commonly involve changes to an organization's division of labor, affecting the work of multiple interdependent groups. How groups interpret change, and respond in turn, will depend on various factors, such as organizational position,

[1] Appelbaum and Batt (1994) and Cappelli and Neumark (2001) provide helpful reviews of early evidence, which suggest that very few firms used high performance practices during the 1970s. Practices like job rotation and work teams started spreading during the 1980s, but overall adoption was limited.

[2] Other surveys of individuals reported similar proportions (e.g., Gale Jr., et al. 2002, Leigh and Gifford 1999, Freeman and Kleiner 2000).

division, and occupation (Batt 2004), and the *context* surrounding their implementation (Appelbaum et al. 2000, Hunter et al. 2002).

For instance, research on teams in a telecommunications firm found important attitudinal variation by position, with team participants reporting greater perceived autonomy, job security, and satisfaction than their counterparts in traditional groups, and supervisors reporting lower perceived job security and satisfaction (Batt 2004: 202). Underscoring the utility of a political framework, the featured firm later eliminated the teams, in spite of positive performance effects (206). Similarly, Hunter et al. (2002) excluded skilled trades employees from their exploration of auto-worker responses to a new team-based agreement, because they reportedly resisted the changes. Such resistance demonstrates the need to examine how reforms affect different levels of an organization, and how actors perceive and respond to them in turn (Batt 2004).

How traditionally insecure contexts in particular influence responses to workplace reform may vary. Efforts can be undermined by worker reluctance to participate due to the perception that new efficiencies will threaten jobs (e.g., Eaton 1994). Practices characteristic of high performance systems have been linked with later employment instability (Black et al., Osterman 2000). Theory suggests that job security provisions build trust, thus deepening worker commitment (Levine and Tyson 1990). Earlier work experiments in the auto industry featured no-layoff guarantees (Adler 1993), with Saturn's extending life-long security to 80 percent of workers (Drago 1998, Rubinstein and Kochan 2001).[3] Others have suggested the inverse, that fear of job-loss provides employees a powerful motivator to cooperate (Drago 1988, 1996; Jacoby 1983). Findings that job security measures are unimportant to adoption are thus less surprising (Lawler et al. 1995, Osterman 1994, 2000). Hunter et al.'s (2002) survey supports this latter view, finding that working in plants poised for closure was negatively related to attitudes towards the new teams, but positively related to team duties performed, suggesting that job insecurity sparked lower enthusiasm but deeper engagement.

While prior work tends to focus on how insecurity affects support of reform efforts among core workers, especially production workers, this paper aims to understand how insecurity affects multiple organizational constituencies. This includes core production and skilled employees, and union representatives at the local and national levels. For instance, reforms that expand the "task variety" of traditionally narrow positions may be viewed positively by incumbents, but could spark anxiety among those ceding long-held "turf" (Wilmers 2020). This also includes managerial employees. Starting in the 1980s, white-collar workers in the U.S.--including salaried auto employees--became increasingly vulnerable to job cuts, particularly cuts stemming from restructuring efforts (MacDuffie 1996, Cappelli 2008). Thus, reforms that strengthen the autonomy or expand the task set of employees at the bottom of an organization's hierarchy may be viewed negatively by those afforded minimal security further up. By contrast, employees in the corporate headquarters, with responsibility for streamlining core operations, are likely to want to advance reform to the extent it helps to strengthen the company's position in a shifting business environment. With exceptions (Adler 1993, Batt 2004, Milkman 1997), the high performance literature treats these groups as homogenous entities or excludes key segments, such as skilled workers, even though reactions to insecure contexts may differ sharply, depending on one's position, division, or occupation.

[3] The remaining segment absorbed volatility.

Second, this paper aims to provide a more nuanced account of insecurity than is evident in prior work. The high performance literature focuses on insecurity tied to risk of more immediate job-loss, either from poor firm performance or enhanced efficiencies resulting from new practices. However, as the labor market becomes more precarious for workers up and down the economic distribution (e.g., Bidwell et al. 2013, Kalleberg 2009), and anchored by service and knowledge work, resistance to work reforms among a relatively job-secure workforce segment might still be rooted in insecurity, but a kind based in fragile or declining occupational status. Research suggests that traits that afford workers security in more traditional work settings--such as age, tenure, and union membership--may be increasingly sources of a potentially more enduring labor market insecurity, which refers to one's ability to find a job similar to their current position (Lowe 2018). Prior research scarcely considers these issues, and how they affect the persistence or survival of change efforts.

Evaluating group responses to workplace change: opportunities and threats

To gain deeper insight into forces limiting the broader adoption of work organization changes characteristic of the high performance model, this paper explores a political explanation through examination of interpretations of workplace change across critical interest groups, using a framework structured around the concepts of *opportunity* and *threat*. In highly insecure contexts, actor responses to work reforms will depend on how they view them either advancing their interests, or those they represent (opportunity), or undermining them somehow (threat). In changing workplaces, interpretations of the role and impact of work reforms by key organizational constituencies will vary (e.g., Gray and Silbey 2014). If work reforms fail to meet group interests, distinguished by position, division, or occupation, and informed by heightened insecurity, then actors have incentives to resist. This means a stalled reform effort might less reflect inertia (Hannan and Freeman 1984), or performance assessments by management, than coordination or inaction by influential opponents. An important question therefore concerns those features or consequences of workplace reform that may spark variation in reported interpretations across core interest groups, including managers, workers, and unions, and key sub-groups. In contexts in which actors confront scarcity, uncertainty, and insecurity, are particular features or consequences likely to be more salient to certain groups than others?

Managers

Despite ample research showing positive associations between high performance work reforms and quality and productivity, including in manufacturing and telecommunications (e.g., Appelbaum et al. 1996, 2000, Batt 2002, Bresnahan et al. 2002, Huselid 1995, Ichniowski et al. 1997, MacDuffie 1995), large-scale surveys and selected case studies find mixed profitability effects (e.g., Cappelli and Neumark 2001, Rubinstein and Kochan 2001, Adler et al. 1997). Further, the consensus on the relative performance benefits of "bundles" of practices is mixed (e.g., Cooke 1994, Katz, Kochan and Keefe 1987, Huselid 1995, Black and Lynch 2001, Cappelli and Neumark 2001).

Therefore, in a demanding and shifting business environment, higher-level managers, in their strategy-developing capacity, may be reluctant to support work reforms—including multiple

reforms—if they fail to meet performance goals. At the same time, to the extent work reforms increase the flexibility with which shop-floor tasks are allocated, particularly in unionized settings, then managers under pressure to implement operational changeovers more quickly, may interpret reforms as opportunities. Therefore, one might expect that in an increasingly competitive business environment, higher-level managers will interpret the work reforms as opportunities, on grounds they enhance productivity and quality, and facilitate greater flexibility in operational decisions. The likelihood they will interpret the reforms as opportunities based on profitability effects is unclear.

Managers also have an incentive to foster workforce commitment, if it induces greater effort and stronger firm performance in turn (Batt and Appelbaum 1995). A more satisfied workforce may also reduce costly turnover (e.g., Dube et al. 2010, Hinkin and Tracey 2000). Management support of employee welfare predicted adoption of selected high performance practices in a national establishment sample (Osterman 1994). Therefore, one might expect that higher-level managers will interpret the work reforms as opportunities on grounds they increase critical dimensions of employee welfare, engagement especially.

As to front-line management, research on teams suggests possible reductions in perceptions of autonomy and job security (Batt 2004, Buchanan and Preston 1991, Milkman 1997). Such perceptions may be especially acute in industries subject to frequent restructuring (Cappelli 2008; MacDuffie 1996). At the same time, participation in new work forms may moderate attitudes towards employees—for example, a national survey found that a greater share of participating managers than non-participants "almost always" found worker suggestions useful (Freeman and Rogers 1999: 131)—as well as make work-assignment processes more flexible. Therefore, one might expect that front-line managers will interpret the work reforms—teams specifically—as threats on grounds they reduce their perceived autonomy and job security. On the other hand, they may interpret work reforms as opportunities on grounds they enhance valuable employee contributions to work decisions and increase flexibility.

Unions

Unions may resist work reforms to the extent they undercut job control, the foundation of union power,[4] represent managerial attempts to speed up work (Adler 1993, Parker and Slaughter 1988); or are "ideological ruses" to diminish union support (Godard and Delaney 2000: 492). Participation has been linked with reduced union interest and more positive attitudes towards management on multiple dimensions (Freeman and Rogers 1999: 142). High performance practices, however, are more likely to be found in union workplaces (e.g., Freeman and Rogers 1999); and union support is greater among participants. Under pressure to save jobs and membership during downturns, unions have conceded to, even facilitated, change (Hunter et al. 2002: 469, Drago 1988, Cooke 1992).

However, unions are not homogenous entities. Rank-and-file workers involved with implementation may appreciate, or challenge, different dimensions of workplace change

[4] Job control is a model of work organization in which contracts define narrow jobs and strict boundaries; earnings reflect job titles instead of skill or performance; seniority governs access to opportunity; and a grievance procedure settles disputes (e.g., Kochan et al. 1994, Piore and Sabel 1984)

compared with leadership, who mainly negotiate policy and are privy to confidential or proprietary information that may moderate their perspectives (Adler 1993, Milkman 1997, Rubinstein and Kochan 2001). At the same time, with less pressure to gate-keep, the rank-and-file may exhibit greater flexibility, and interpret reforms positively.

Moreover, work reforms characteristic of high performance often include reductions in skilled and production job classifications, and more fluid divisions of labor more generally (e.g., Keefe and Katz 1990, Adler 1993). A historically powerful and tradition-steeped constituency of the U.S. labor movement, craft occupations, or the skilled trades, have traditionally protected their position by restricting access to their tasks and skills, through lengthy apprenticeship training and highly specific job definitions in contracts (Weber 1963, Weeden 2002); yet research of work organization changes in unionized firms often excludes them, in certain cases because they resisted change efforts (e.g., Hunter et al. 2002). To the extent reforms broaden access to tasks or skills to which these workers had exclusive rights historically, thus undercutting a traditional source of their power, we should expect representatives to view them negatively. As traditional status markers associated with craft culture more generally lose value in a changing labor market (Lowe 2018), skilled trades leaders may view new work forms as threats on behalf of members. Therefore, one might expect that union interpretations of work reforms will vary by occupation, or occupational constituency. In particular, skilled trades representatives are more likely to interpret work reforms as threats to the extent they broaden access to their tasks and skills. Additionally, union interpretations of work reforms may vary by organizational tier. Amid longer-term union decline, members of national union leadership, national or local, are more likely than rank-and-file members to interpret work reforms as threats.

Workers

Prior research links work organization changes to dimensions of job satisfaction, including autonomy (Batt 2004, Batt and Appelbaum 1995), work effort (Freeman and Rogers 1999, Adler et al. 1997, Adler 1993), and trust and commitment (Appelbaum et al. 2000). For instance, Batt and Appelbaum (1995) found that self-managed teams led to increases in perceived autonomy for maintenance and customer service employees of a telecommunications firm, and greater job satisfaction for those in maintenance. While the small teams anchoring NUMMI reduced worker autonomy, they were key process improvement forums, with workers encouraged to continuously suggest cost-saving changes, most of which were implemented (Adler et al. 1997: 68; Adler 1993). Work reforms may also improve perceptions of group relations and performance (e.g., Batt and Appelbaum 1995; Freeman and Rogers 1999: 133). Thus, one might expect that workers will interpret work reforms as opportunities to the extent they increase dimensions of job satisfaction, especially perceived autonomy and engagement (or work effort).

Further, evidence points to rising skill requirements in work around the time firms started adopting new work forms (Cappelli 1993, Osterman 1995). Linking these changes with employer perceptions of changing skill needs of production jobs, Gale Jr. et al. (2002) found the strongest associations with increases in interpersonal and problem-solving skills.[5] Additional evidence, including worker surveys (e.g., Leigh and Gifford 1999), found associations with heightened training (e.g., Osterman 1995, Lynch and Black 1998, Frazis et al. 1995), while others linked

[5] Case studies documented motivational and interpersonal skills training (e.g., Milkman 1997).

changing skill requirements and training effort with new technology and work practices, and management decisions about their integration (e.g., Bresnahan et al. 2002, MacDuffie and Kochan 1995, Gale Jr. et al. 2002).

The literature tends to focus on the skills and training outcomes of new work forms on core production or non-supervisory jobs broadly defined, but predictions should vary, depending on a worker's position in an organization's skill or occupational distribution. Work reforms characteristic of the high performance model promote flexibility, broader jobs, flatter hierarchies, and reduced adherence to rigid shop-floor rules in general. Hence workers granted exclusive rights to certain jobs under traditional arrangements, and paid higher wages in turn (Wilmers 2020), may view efforts to redistribute tasks, cross-functionally train, or loosen divisions of labor in general as threats, while those who lack specialized skills or access to low-cost skill-development opportunities, or mobility more broadly, may view reforms positively. At the same time, workers with exclusive but increasingly obsolete skills may also view certain reform efforts positively to the extent they provide access to new skills or training. However, when new technology is a vehicle for organizational change, heightening demand for traditionally higher-skilled workers and even raising the skill requirements of certain work, then responses may be more positive (Milkman 1997).

Thus, one might expect that interpretations of work reforms as opportunities, with respect to skills and training, will depend on one's position in the occupational distribution. Workers who benefit under more traditional work arrangements, for instance, because they have exclusive rights to certain work, will view work reforms as threats. At the same time, those who have fewer skill-mobility opportunities under traditional arrangements will view reforms as opportunities, to the extent they increase the variety of tasks they perform. The extent to which the reforms are introduced with technological change may trigger inverse reactions, however, depending on the skill requirements of new technologies.

DATA AND METHODS

I test these predictions using data drawn from semi-structured interviews conducted over 2018 and 2019 with forty-five union and non-union employees of the core manufacturing workforce of a U.S. automaker, AutoCo (a pseudonym); non-union, professional employees; and national labor union employees. AutoCo is an automotive manufacturing firm, with domestic and global operations. The core unionized workforce includes production employees, skilled trades employees, and apprentices. Production employees, or operators, mainly operate the assembly line, in teams. Skilled trades employees maintain plant machinery and install new equipment. They complete a multi-year apprenticeship in a craft occupation, like industrial electrician or millwright.

AutoCo is the site of two work reforms. When fieldwork started, discussions were ongoing among the company and the union about the effects of emerging product and process technologies, how best to organize work in the plants, and skills training capacity. Nationally, the company introduced the first work reform, maintenance teams, as part of a two-site pilot in 2009; they were formally expanded in 2011. They permit certain skilled trades employees, as members

of self-managed teams, to cross job boundaries. The second reform, production minor maintenance, was formally reflected in the national contract starting in 2007 (though it had been a part of operations informally since much earlier than this).[6] It redistributes certain lower-level maintenance tasks from skilled trades to production employees.

I was based at a plant containing multiple facilities, and covered by two collective bargaining units (herein referred to as the Midwest plant). The first unit, which included the final assembly production area, was one of the pilot sites of maintenance teams; they were still in use. Its local contract also contained supportive language of production minor maintenance. The second unit, which included body and stamping areas, and contained a higher proportion of skilled employment relative to the first unit (31 percent versus 12 percent), also had supportive language of production minor maintenance, as part of a modern operating agreement reportedly dating back to the late-1980s, but did not support it or teams.[7]

This paper explores a political explanation of low adoption of the two work reforms through examination of interpretations across stakeholder groups. The non-random sample was constructed to create sufficient variation in organizational position and departmental affiliation (see Table 1). The plant sample included higher-tenured hourly employees from the first bargaining unit, and selected local union leadership (both elected and appointed) and front-line managerial employees from both bargaining units. Company participants were from departments with oversight of work organization decisions, including manufacturing engineering, employee and labor relations, lean manufacturing, and workforce development. Labor union employees similarly oversaw relevant joint programs, including supply chain and product sourcing, quality and performance, and skilled trades issues.[8]

[Insert Table 1 about here]

The purpose of interviews was to gain insight into the two work reforms, according to the plurality of perspectives represented in the sample. I used an interview guide to facilitate comparison across participants. Questions were open-ended and touched on implementation issues, perceived objectives, and associated challenges. Further, interviews sought to collect information on multiple dimensions of the environment, including skills training and employee development; core workforce competency; workforce policies and procedures; organizational structure and governance; organizational change; stakeholder interactions and authority relations; and the external environment.

All interviews were recorded and transcribed. Most interviews of non-union and union plant employees were held on site, during regular production hours, in labor relations offices. Interviews of national union employees were held at AutoCo's headquarters, at the national joint training center, or by telephone. The majority of interviews with company employees were held on site, in offices or spare conference rooms. AutoCo officials provided data and documentation

[6] Reports in national union material at the time framed the introduction of a formal minor maintenance definition in the 2007 contract as a way to better maintain boundaries between the skilled trades and production employees.
[7] The unit was reportedly the first in AutoCo to adopt a modern operating agreement, dating back to the late-1980s.
[8] To further protect the identity of participants, this paper obscures certain details of their position and/or affiliation, either with the company, the plant, or the national union.

where feasible (e.g., process documentation; plant demographic data; confidential organization charts; etc.). I drafted field notes where possible, reflecting extended plant tours, informal observations between interviews, and informal interactions. Once I completed my fieldwork, I conducted more methodical, repeated analysis of interview transcripts, fieldnotes, and documentation using Atlas.ti and Microsoft Excel. Initial coding was based on categories derived from the interview guide, along with those generated inductively, while broader thematic codes emerged later on. Coding proceeded on approximately two dimensions, with the first being focused on the "facts" of the production process, workforce training protocols, and the like, while the second paid attention to explanations or introspective talk. Memo-writing was done in parallel to coding, and captured deeper reflections on broader themes.

Union governance

The international union representing AutoCo is relatively centralized, with an executive board and individual departments centered around industries and companies in which members are concentrated across the U.S. Within each department, including the AutoCo department, appointed staff coordinate contract bargaining and joint programming under an elected vice president. Joint programs are forums for the parties to coordinate workplace issues of shared interest, including supply chain and product sourcing, quality and performance, and skilled trades issues.

Efforts to implement the two reforms occur in a relatively cooperative labor-management context—in spite of longer-term union decline—and are managed by the quality and performance division, the source of work reforms characteristic of the high performance model. Its roots are in employee involvement efforts, which date back to the 1970s.[9] Appointed staff persons work with company employees in lean manufacturing and employee and labor relations. Union officials who oversee skilled trades issues help to coordinate maintenance team implementation.

In plants, union representatives negotiate local agreements within national standards, mainly on shop-floor issues, including job descriptions, work practices (such as teams, including the two reforms under study), and job moves or transitions. Certain plants are relatively "progressive"—e.g., operators rotate jobs; they de-emphasize seniority. On the whole, however, the union adheres to principles of job control.

Although the union is an industrial union—meaning it brings together workers linked by a product or service, regardless of craft or skill—the skilled trades are a historically powerful group, with dedicated governance structures to advance their interests, including: an international department[10]; separate ratification and strike-vote procedures over issues pertaining directly to them; and local representation (Weber 1963).[11] Offsetting structures help to limit their influence.

[9] A profit-sharing program started in the early-1980s.

[10] This refers to a department in the international tier of the labor union, the union's highest tier.

[11] In spite of an industry-based membership, spurts in skilled trades militancy are evident throughout the AutoCo union's history. Throughout the 1950s and 1960s, skilled workers threatened to separate from the union (Weber 1963: 400) due to concerns they were underpaid relative to other trades and production operators, and fears of technologically-driven skill dilution. Research suggests the largely Anglo-Irish workforce at the time was driven further by anti-immigrant sentiment against the diverse production workforce and an aversion to the international

For instance, the national negotiating committee has skilled trades negotiators; but provisions are subject to approval by others. Final contract approval rests with total membership, the majority of whom are "non-skilled." Nevertheless, tension rooted in efforts to reconcile their interests with those of other occupational groups persists.

Their power, and longer-term job security, rest in their ability to resolve equipment breakdowns (Piore and Sabel 1984: 123), or what Crozier (1964) called "the last source of uncertainty" in an otherwise "routinized" system (154). Mass production would not be feasible without continuously operating equipment. Hence they limit access to their skills by enforcing strict occupational boundaries, resisting outsourcing, and controlling apprenticeship training (Piore and Sabel 1984).

Two underused work reforms at AutoCo: Maintenance teams and Production minor maintenance

The two work reforms are part of a gradual increase in policies over the last roughly two decades altering traditional divisions of labor across skilled trades workers, and between production and skilled workers at AutoCo. The first reform allows mechanical skilled trades employees to perform across job boundaries, as members of self-managed teams, herein referred to as *maintenance teams* or skilled teams. In other words, they can perform tasks traditionally assigned to each of the classifications represented on the team, as part of a blurring of job boundaries historically prohibited. The multi-site pilot was introduced in 2009, when the company and union jointly agreed to modify the 2007 contract, to better shield the firm's finances from the deep recession underway. The 2011 national contract launched them formally across the U.S., and incorporated electricians (see Table 2 in the Appendix for a timeline of the reforms).[12] An appointed team leader helps with supervisory tasks, like assigning work and ordering parts. Team members learn new tasks on the job, and earn the negotiated wage of the team's highest-paid classification.

The second reform delegates lower-level maintenance tasks from skilled to production employees, including fluid and lubrication maintenance in immediate machinery, debris clearing, and inspection of loose components. In the event of a minor breakdown, this policy allows the closest operator, or production employee, to resolve the issue themselves. The practice is typically called *production minor maintenance* or autonomous maintenance. As of the 2015 national contract, operators engaged in minor maintenance were to receive formal training and a modest raise. Technically, these benefits are linked to participation in production work groups (PWG), which are autonomous teams that integrate skilled and production employees and feature production minor maintenance as part of the work process. On a spectrum of most traditional to least traditional forms of work organization, PWG represent the least traditional.[13]

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leadership's "social unionism" (Lichtenstein 1995: 415). But such attempts were thwarted by national labor board rulings or union placating strategies (Lichtenstein 1995: 415, Weber 1963: 402).

[12] Though participants were to adhere to strict lines of demarcation between electricians and mechanical skilled trades employees.

[13] Essentially, PWG provide a forum in which to formally manage allocation of minor maintenance from skilled to production workers. They are intended for more automated areas of production, including machining, body, and stamping, and are modeled off of work groups in place in selected AutoCo European facilities.

There was consensus across stakeholders that both work reforms were underused across AutoCo's U.S. operations relative to company objectives. At the Midwest plant, again, maintenance teams were used in the final assembly and paint production areas (since the 2009 pilot). In final assembly, there were reportedly three maintenance teams and three leaders, including two mechanical and one electrical.

As to production minor maintenance, the final assembly unit's local contract had supportive language, dating back to 2009-10.[14] However, it was an accepted part of the work process in few areas. For example, on the tire line, where caged machines married together rims and tires, team leaders reportedly performed tasks traditionally assigned to electricians. Items would become askew as they moved between line segments. Operators would commonly lock the station, open the gate, and re-arrange items as needed. Operators on the frame line would commonly reset faults on hand tools, a task the contract assigned to electricians. An electrician would be called after multiple faults.[15] Otherwise, minor maintenance was reportedly rare.

The second bargaining unit, covering body and stamping, and where skilled employment was nearly double that of the first bargaining unit (31 percent versus 12 percent), worked under a modern operating agreement (MOA), dating back to the late-1980s. The MOA featured production minor maintenance, along with job rotation among production teams—as a relatively automated unit, production work was more rudimentary than in final assembly or paint.[16] But with possible exception of one area, it did not support either reform (production minor maintenance or teams).[17] The reportedly high number of electricians meant that maintenance help was rarely out of immediate reach.

The higher prevalence of maintenance teams in assembly reflected the adoption pattern across U.S. operations generally. According to joint documentation, there was one maintenance team for every seven to eight production teams, representing 12 percent of the combined total.[18] For reference, skilled employees were 17 percent of unionized workers in 2018. Of all maintenance teams, about half were in assembly plants; the remainder were in powertrain or stamping facilities. Reports from the national union, however, suggested that even where teams were approved, it was unclear whether they were operational.

The rate of production minor maintenance is more difficult to estimate, in part because it occurred informally or outside discrete work structures.[19] Use of PWG, the integrated teams that

[14] The local contract includes a letter of understanding dating back to negotiations regarding a late-2000s vehicle launch.
[15] Similarly, the glass cell, where the windshield is positioned on the car, is reported to engage minor maintenance, with an electrician reportedly stationed close by.
[16] As to other similar efforts to increase production worker engagement, a couple of managers described an older "predictive maintenance" program at the Midwest plant, no longer in use, where production operators would come into the plant during off-hours, on the weekend, and clean and inspect the equipment. Interviewees spoke highly of the program.
[17] A manager reported instances of production operators in the press room performing minor maintenance work traditionally assigned to skilled trades.
[18] Production teams were much more widespread across AutoCo's U.S. plants.
[19] One could review all local contracts to check for language supporting production minor maintenance; but local contracts are not readily available (nor are national contracts from earlier than two bargaining cycles ago). Further, what a contract provides and what employees in plants permit may differ.

feature minor maintenance, could provide an approximate sense of engagement. There was one for every six to seven production teams in 2018, representing about 13 percent of both. Reflecting the original intent to use them in more automated areas, nearly two-thirds were in powertrain facilities; the remainder were in stamping and assembly. Neither unit at the Midwest plant incorporated them.

FINDINGS

In the following sections, I examine reported interpretations of the two work reforms as *opportunity* or *threat*, and consistent with this paper's model, describe the particular contexts, characterized by heightened insecurity and uncertainty, that inform the reports of each group.

Both work reforms alter traditional divisions of labor—between selected skilled trades classifications, as in the case of maintenance teams, or between production and skilled trades workers, as in the case of production minor maintenance. Actors within AutoCo confront multiple sources of insecurity, in their daily work and broadly. In insecure and uncertain contexts, how actors take to the work reforms will depend on how they view them either advancing or serving their interests, or interests they represent (opportunity), or undermining or subverting them somehow (threat).

I first examine accounts of maintenance teams; then I examine production minor maintenance. Within each work reform, I group accounts by primary organizational position. Given the salience of plant affiliation, as demonstrated over the course of fieldwork, I separate out accounts by manufacturing, or Midwest plant-based, employees. Featured sub-sections are as follows: AutoCo professional employees (or higher-level managers); national union employees; and Midwest plant employees, including non-union (or salaried) supervision, union leadership, and union (or hourly) employees. Following this examination, I attempt to explain why the two work reforms are underused, at the Midwest plant but also across AutoCo's U.S. sites broadly.

Maintenance Teams as Opportunity

AutoCo professional staff

Though highly interdependent, AutoCo professional staff with involvement in work organization and training decisions—manufacturing engineering, employee and labor relations, lean manufacturing, and workforce development—were not a homogenous entity. For example, they disagreed over AutoCo's skills training approach, including recent decisions to transition the launch training department out of manufacturing and reduce staffing in an important plant coordinator role. As managers, however, their common charge was to execute performance-enhancing practices, in the face of multiple threats to the company's longer-term survival—made evident by a salaried workforce restructuring during my fieldwork—including continued growth of foreign producers, disruption from the technology industry, expected technological change requiring shifting skill demands of their core workforce, and shifting consumer preferences, most

recently for trucks and SUVs. The Midwest plant was in between the launch of two higher-profile vehicles during my fieldwork.

Thus, in a demanding and shifting business environment, managers shared a common interest in increasing shop-floor flexibility, broadening the scope of work the skilled trades perform, especially the mechanical trades, whom one employee remarked had "open capacity" and excessive "idle time" between them, and reducing high skill specificity in general. They viewed maintenance teams as one solution. For example, a labor relations employee remarked on the need to reduce siloing of skilled employees, and cited challenges posed by strict local contracts featuring sharp lines of demarcation to implementation of more flexible work forms. They referenced a model that would collapse mechanical trades into one classification, highlighting that such a structure would not result in fewer skilled trades employees, as many feared:

> *Some places have very strict contractual language. […] We, as a company, would like to get away from some of that. And it's not that we're going to have fewer electricians or pipe fitters or machine repairers or welders. But we want to blend that. If you were to study the best of the best as far as how trades work, in some of our automotive [operations], they'll have what's called a mechanical and an electrical trade, and that's it. […] Electrical guys focus on the electrical work […]. And the mechanical guys could be all-inclusive of pipe fitters, welders, millwrights, that type of work. It just becomes more efficient if you think about it.*

A manufacturing engineering employee similarly cited the cost-savings generated from use of fewer skilled employees per maintenance failure, explaining how a maintenance action is typically handled, and how it could be under a team structure:

> *In the absence of a team, a ticket gets placed for a millwright to remove a guard. Then once the guard is removed, a ticket gets placed for the machine repairman to analyze the mechanics. Then depending on what they find, a ticket would go in to call over the electrician to review the switches and cameras. Whereas in the team concept, the team leader would evaluate the performance of the equipment and then assemble a plan and deploy the necessary resources. That might mean that the millwright that removes the guard also inspects the mechanicals.*

Though corporate staff emphasized the effect of teams on operations, worker effects did not elude them. According to the same manufacturing engineering employee, the team structure also provides a forum for skilled employees, whom they called "the most knowledgeable about the equipment and process," to negotiate with each other, absent supervision, about how work gets done. This could result in different allocations of maintenance tasks among them, depending on the skills of participating employees. Similarly, an employee who co-coordinates quality and performance work structures across AutoCo's U.S. operations, including teams, remarked how the teams boost worker morale and engagement, and solicit valuable worker feedback from the "front lines," calling them a "win-win" for both parties.

National union staff

National union staff who coordinate policy for AutoCo's skilled trades workforce, as part of joint program leadership, helped to oversee maintenance teams in partnership with the quality and performance department. They executed this work amid change and uncertainty for the skilled trades, particularly since the Great Recession. The skilled trades have consolidated and contracted: the 2007 contract consolidated an estimated 185 classifications into 14 "core" apprenticeable classifications; there were nine as of this writing.[20] In 2007, the skilled trades represented about 22 percent of AutoCo union workers; in 2018, they were 17 percent. Further, they were also the oldest segment of hourly workers, with a mean age of over 50, and were expected to retire in large numbers over coming years.[21] At the same time, questions persisted about their readiness for technological change. In 2015, the company and the union relaxed certain apprenticeship eligibility rules and upgraded curricula, to help backfill expected shortages, ensure continuous new flows of trainees, and meet changing skill requirements. The company had not funded new apprentices for the prior decade at least, because of recessionary cutbacks.[22] The company also upgraded the national joint training center.

The agreement to pilot maintenance teams emerged from 2009 contract modifications spurred by the crisis conditions of the Great Recession. The teams were reportedly the union's response to a proposal to collapse mechanical classifications into one category. With the auto industry on the brink of collapse, the union was weakly positioned to resist. As written, the teams permit mechanical trades members to cross traditional lines of demarcation, a practice at odds with core union principles: "As a tradesperson, that's the Eleventh Commandment: thou shalt not perform anybody else's job," remarked one national union employee, when describing the teams.

Nevertheless, union descriptions framed the teams as an opportunity. Explanations centered on control—when implemented as intended, teams increased skilled trades' control of the work process. Skilled trades workers are experts, in their view; hence it would be imprudent for the company not to implement structures leveraging this expertise. One skilled trades union official remarked as follows:

> *The great thing about it, and why we fully agree with, and embrace it, is that if you let the trades run the operation, and the company lets go of the steering wheel, and we do our preventive maintenance—we prioritize and we work with the production work teams, making that a better job for them, whether it's safety, whether something cycles better or runs smoother for them. They [the teams] make the assignments. They order the parts. They plan the preventative maintenance. They do everything. I think it's great.*

The team policy, as formally introduced in the 2011 national contract (after the 2009 pilot), included mechanical trades only; the 2015 contract incorporated electricians. Union employees emphasized, however, that electricians were not to perform mechanical duties and vice versa. The final assembly unit at the Midwest plant maintained separate mechanical and electrical teams.

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[20] Thirty-eight were consolidated into three non-apprenticeable classifications. 128 classifications were eliminated or labeled "will not repopulate."

[21] This compares with early 50s for higher-tenure production employees, mid- to late-30s for in-progression employees, and early 30s, the youngest, for temporary employees.

[22] The company funds the first two years of training; plants must fund the remainder out of existing budgets.

A general deference to electricians persisted throughout interviews across groups. Electricians were among the more traditionally skilled segments of the union, and underwent lengthier training during vehicle launches.[23] This is rooted in the relative complexity of their work, and demand for their skills.[24] Electricians install and maintain electrical circuits, fixtures, and electrically-powered equipment. The diffusion of digital production technologies was expected to increase demand for stronger IT capabilities—most electricians could wire a house, but reportedly struggled to repair more complex robotic equipment. To help fill this gap, the parties jointly agreed in 2011 to pilot a new electrical classification, to divert lower-level programming of factory controls from externally-hired engineers to union members. It became an official classification in 2015, but take-up has been low. Regarding the distinctions between electricians and mechanical trades and team participation, the same official noted the following:

> *Electricians are on their own. The [maintenance teams] are everybody except electricians and tool and die. So those are the [trades] that keep the mechanical side of the plant running. They would work together as a team, but they wouldn't share each other's duties. Electricians would do their own thing.*

Plant employees: Salaried supervision

Considerable pressure bore down on AutoCo's front-line supervision. AutoCo had reduced its salaried employment in U.S. plants, by cutting staff or eliminating roles altogether. Each major production area—for example, paint or final assembly—is typically run by a manager, beneath which are two departments, production (operators) and maintenance (skilled trades). Selected maintenance departments—including the final assembly department at the Midwest plant—had eliminated the role formerly known as superintendent. Further, AutoCo had reportedly greatly reduced the most front-line salaried role called process lead, resulting in ratios of hourly workers to process leads across U.S. operations that were reportedly much higher than the preferred ratio of ten to fifteen to one. The Midwest plant had a more favorable ratio of salaried to hourly employees of roughly thirteen to one. [25]

I interviewed two floor-level maintenance managers from the assembly side of the Midwest Plant. In these roles, they supervised and worked closely with skilled employees, and observed the maintenance teams first-hand. The department included three teams—two mechanical teams comprising mechanical trades, and one relatively large electrical team, of about thirty electricians. Team leaders, two mechanical tradespersons and one electrician, reportedly helped to coordinate work as needed.

Both managers reported high stress and overwork. On working in manufacturing, one manager said it "feel[s] like you have a tether on your ankle," and pointed to inconsistencies between

[23] They receive the same number of hours of training as other apprentices.
[24] They represented approximately 40 percent of skilled workers, a figure expected to rise to about half over coming years, according to a national union official.
[25] The salaried figure includes off-line human resources and labor relations employees, suggesting that ratios on the floor may have been lower. These figures are based on company-provided cross-sectional plant data. I was unable to receive from the company historical data reflecting U.S. plant operations.

stated AutoCo objectives regarding operational effectiveness and reality, and doing more with less: “I have objectives and deliverables, yes, but the bottom line is, keep the place running.” Having recently completed a substantial vehicle launch, the second more senior manager reported not having two consecutive days off in nearly a year, and working more than 80 hours per week. He reported that his department had been cut from nine to seven people over the prior two years, and tasking salaried coworkers with work outside of their normal skill set.[26]

While they agreed on the stress of manufacturing work and the negative effects of downsizing, their accounts of the teams’ contributions differed slightly. One manager spoke highly of them, calling team leaders “quasi-supervisors,” and noting his substantial reliance on their help. He spoke positively of their structure, work dynamics, and contributions, suggesting employees were flexible, engaged, and worked together. He reported little resistance when teams were first introduced, and credited the fact that team leaders were hourly skilled workers, too.[27] Notably, he credited the teams with supposed increases in insourced maintenance work to the plant. A few interviewees, from the company and the union, pointed to increased training investments on behalf of the skilled trades workforce as an effective strategy to reducing reliance on reportedly more expensive outside engineers. He remarked as follows:

> *Two of my leaders, they encompass all the mechanicals. […] My electrician owns all of the electricians, and depending on the project, he'll bring other people into the fold. He will bring in a pipe fitter. He will work hand-in-hand with the [mechanical] leader. [We’re] very dynamic in how we work.*
> *[…]*
> *[The teams] brought on more work to this plant in the past year-and-a-half than the guys have ever seen. And it's a testament to my leaders and their engagement and the buy-in from the floor.*

Similar to the preceding account, the second manager reported relatively little conflict regarding lines of demarcation; conflict usually arose concerning overtime assignments. He indicated, however, slightly greater adherence to traditional work arrangements than suggested above—for instance, to individual mechanical trades versus a general mechanical team—and attributed increased shop-floor flexibility to an aging workforce and shifting compositions of skilled employment towards external hires.[28] As to how he typically assigned maintenance work, he described defaulting to the core trade associated with a particular task. When necessary, employees were open to assistance from related mechanical classifications, but he reported favoring the core trade, as they are typically the most qualified, as follows:

> *As a maintenance guy on the floor, I'm not calling for either an electrical guy or mechanical guy. I'm still calling for that individual trade: ‘I need a pipe fitter, I need a tool maker, I need a machine repairman, I need a millwright.’ We've never fully embraced that; or I should say, we never embraced it <u>at all</u> here.*
> *[…]*

[26] His department lost an engineer and the role formerly called superintendent.
[27] This is similar to the production work teams, which are led by other hourly production employees.
[28] This is compared with skilled trades employees who completed the AutoCo apprenticeship and rose internally.

> *If you have a machine repair job, and the machine repairman needs a second machine repair guy, if he knows […] what needs to be done, I could say, 'Hey, I'm going to send you a millwright, so you have another guy to help you.' There are usually no problems with that. [But] ultimately […] with me as a supervisor who's known these guys for years, if somebody said, 'I need to get something rigged,' […] I'm going to still go to the millwright who knows how to rig.*

Plant employees: elected or appointed union representatives

The primary roles of local union leaders were to enforce union policy, help workers resolve issues, and file grievances.[29] Local unions negotiated separate agreements every four years, within the national contract's framework. As local leaders representing the skilled trades, they experienced hourly workforce challenges in real time, but also appreciated the broader, longer-term challenges facing membership, especially readiness for new and emerging technologies. Skilled representatives of both bargaining units were critical of training resources and processes for skilled trades employees. Further, it was suggested that union members were taking on greater supervisory work, a historically taboo boundary-crossing.

Regarding maintenance teams, a skilled trades union representative from the assembly side of the Midwest Plant—whom national union employees credited with the survival of the maintenance teams at the Midwest plant—strongly supported the teams and greater flexibility more generally, and, like national skilled trades officials, described them in terms of their contributions to employee involvement and shop-floor control. Further, like the salaried supervisor cited earlier, this representative likened the team leader role to a salaried position:

> *They're working with the management team, as far as job assignments, scheduling. So that is more of a salary role. […] They're doing the administrative work with the salaried supervisors, just to make sure that we [have] everything lined up to get the work done.*

He spoke of how the union and skilled employees resisted maintenance teams when first introduced in 2009, viewing them as a company strategy to reduce headcount and eliminate job boundaries (this account is at odds somewhat with the more positive supervisory report above). It took time for the structure to mature. He called his plant flexible; other plants are less flexible, which will hurt them.

With respect to skill, he remarked how the teams helped with complex maintenance failures, or "headscratchers." Echoing broader concerns across AutoCo constituencies regarding variability among the skilled trades and readiness for new technology, this representative remarked that certain trades were slow to keep up with new technologies in their field, and was especially concerned about AutoCo's skilled electricians, a growing segment of AutoCo's skilled workforce. Teams provided a forum in which to exchange knowledge and expertise.

In spite of relatively progressive-sounding views, however, this representative insisted on honoring traditional lines of demarcation, and was quick to highlight the value of specialized

[29] I interviewed a handful of elected and appointed union officials at the Midwest plant, from the final assembly unit and the body and stamping unit. Most, but not all, were skilled trades union representatives.

skills and training, and likened use of different trades for tasks outside of their lines of demarcation to "[sending] a heart surgeon to work on someone's knee." Further, in spite of being relatively trusting of the company, he conceded that employees should "be careful," because of the possibility the company will "whack heads," or lay people off. On broader concerns about skill dilution, they said:

> *The fear from the trades is you're slowly migrating to a jack of all trades. And you're not protecting core trades. I don't necessarily believe that's the company's vision. I think that'll be a great mistake. I think they need to make sure they recognize the core trade. Because each trade [has a different] specialized skill set. You're not going to send a heart surgeon to work on someone's knee.*

Plant employees: hourly team participants

Skilled trades employees at AutoCo earned the highest compensation of hourly workers, with the average hourly compensation per active legacy production worker equal to about 92 percent of the equivalent for skilled trades employees, while the average hourly compensation per temporary and in-progression employee was about 69 percent and 35 percent, respectively. Unlike salaried supervision, their wages and working conditions are enshrined in a collective bargaining contract, meaning they could leave work when their shift ended, or else earn generous overtime. In spite of markers of relative stability and security, however, interviews with three high-tenured skilled workers in the final assembly unit indicated relative openness to change, interest in continuous workforce development, and awareness of industry volatility.[30] This was at odds with more consistent reports elsewhere, especially among managers, of lower enthusiasm for continuous training among the skilled trades. For instance, a higher-level plant official remarked that they preferred to hire apprentices from the external market (usually suppliers)—again reflecting concerns expressed elsewhere of skill variability.

Two of the three employees discussed the maintenance teams in highly positive terms. The first employee, a mechanical tradesperson and former team leader, discussed maintenance teams as part of a broader need for change. [31] He acknowledged the auto industry's increasingly competitive nature, and linked teams, and flexible work practices more generally, to stronger firm performance. In his view, strong firm performance enhances job security, like so:

> *The more work you can do, the more efficient you are. It's like I say, I'm competing with the guys doing my job at [a foreign transplant] […]. If that guy gets more efficient, then that hurts our company. […] [A]t the end of the day, I want job security. To me, job security [means] your company is healthy.*

[30] One of them, a millwright, reported interest in pursuing training to be an electrician (though he said this interest was somewhat out of the norm for skilled trades), and reported not having received any training at all for the recent vehicle launch.

[31] I interviewed a third trades person, an electrician and electrical team leader, but teams did not come up explicitly in our interview. I did not enter the field with the intention of exploring implementation of these two policies. Only later in my fieldwork did I learn about the company's efforts to expand their use. This also accounts for why I lack first-hand accounts of minor maintenance tasks, and production work groups, by production workers. The three production workers I interviewed were very high tenure, each with decades of seniority, and worked in special off-line roles associated with vehicle launches.

Further, he spoke highly of the elected union representative, cited earlier, whom he viewed as flexible, open to change, and "really good." He described how proactive change is likely to reduce the need for future upheaval:

> *Guys like them are realistic, and understand that, today's world, it changes; and you have to embrace the change or you die. […] And, what's great is being able to see that on the horizon, before any bloodletting, before the change has to be really radical. It's better to catch cancer when it's small than when it gets so big that you have to lop something off.*

Another skilled employee, also a mechanical tradesperson and former team leader, described the teams in terms of how they break down boundaries between mechanical classifications, enhance efficiencies, and deepen worker involvement, especially in the vehicle launch process. Further, he likened the team leader role to a salaried role, indicating that leaders were taking on work that used to be under the purview of supervision. The Midwest plant had recently completed a significant vehicle launch. AutoCo's launch process formally engages a small number of appointed hourly employees from across major production areas. Skilled employees visit suppliers, ensure the equipment meets appropriate standards, and help develop skills training.[32] At the Midwest plant, employee involvement was regarded positively because of the expertise that hourly workers reportedly contribute to launch decisions. Of worker involvement, he said:

> *We are taking on more responsibility at work. It does give the trade more of a voice of how things get done, when things get done. […] Before the boss would just get the guys the jobs, and […] chase parts; where now, we're chasing parts, we're getting with the [launch] team, getting with the [industrial engineers].*

Similar to the earlier elected union leader's point, teams also reportedly provided a forum for workers to help each other. Again, interviews from across AutoCo indicated variation both in skill-level and enthusiasm for further upskilling among skilled trades employees. For example, a skilled electrician, who served as electrical team leader at the Midwest plant, said that his team tended to rely on a smaller expert group of workers, or in other words, "on the smaller group than the group you have" or what he called "five people with extreme knowledge," out of a team of thirty.

Maintenance Teams as Threat

Interpretations of maintenance teams as a threat were much less frequent than interpretations of them as an opportunity among sample members. Accounts of this type were limited to first-line salaried supervision in plants, according to second-hand accounts, and local union leadership in the more highly automated bargaining unit, as follows.

Plant employees: Salaried supervision

[32] Either vendor-provided or in-house training

The process lead position is notoriously high-stress. For instance, shortly before shifts start, process leads must account for absences and fill open roles as quickly as possible. This is one reason why employee skill versatility is important, as it facilitates necessary shifting of operators. They receive up to two weeks of team leader and dedicated process lead training; and reportedly earn just above the highest-paid hourly employee. The standardized production system assigns them duties to support continuous improvement,[33] but the daily stress of the job often hampers this work. One salaried plant supervisor called it "the worst position in [AutoCo]," whether in maintenance or production. One company employee conceded that AutoCo had perhaps gone too far with downsizing, and was in the position of having to consider moderating measures.

Unfortunately, I was unable to interview any process leads, because of the reportedly intense demand for them on the line. However, accounts by company and union employees suggested they may have viewed the teams as a threat; further research is needed to verify these accounts. One national union official reported process lead resistance at the second site of the 2009 maintenance teams pilot—not the Midwest plant—in spite of reaching agreement nationally with the company. He spoke of supervisors not wanting to "let go of the wheel." Another union employee described the pushback from process leads, similarly, as a reaction to losing control and significance to the work process overall, which is unsurprising given characterizations elsewhere of the maintenance team leader role as "quasi-salaried." Two company employees from labor relations and lean manufacturing, respectively, reported similar instances of pushback.

Plant employees: Elected or appointed union officials

Support for maintenance teams was not unanimous among union officials at the Midwest plant.[34] The highly automated stamping and body bargaining unit—where skilled employment was more than double the share in the final assembly unit, mainly because of the equipment requiring maintenance—did not support maintenance teams. This bargaining unit is somewhat notable, in that it maintains its own permanently-staffed training center, which coordinates technical training for skilled employees both during and outside of vehicle launches. Given this internal capacity, this unit relies less on outside vendors for training than the other bargaining unit. Few other plants supported similar infrastructure, including the final assembly unit, which reportedly used to maintain internal training resources and space (at the time of interviews, the space was being used for storage and as temporary office space for visiting salaried launch officials).[35]

The variable emphasis on self-sufficient, in-house training for the skilled trades, and the importance of continuous skill development, contributed to perceived cultural differences between the two bargaining units. The final assembly unit relied more heavily on external, vendor-provided training. Like final assembly unit union representatives, a representative from

[33] For instance, they are supposed to regularly observe and collect feedback from operators, to ensure they are performing up to standards.
[34] Unfortunately, I was unable to interview additional hourly employees in the second bargaining unit, so could not verify whether his position represented the consensus view of skilled employees among the rank and file.
[35] Given the expected training challenges of the upcoming launch, managers expressed interest in re-dedicating at least a portion of the space for production worker training.

the stamping unit expressed concern over the AutoCo skilled workforce's lack of preparedness overall for accelerating technological change. This representative also criticized the lack of sufficient national union coordination in response to the company's reportedly increased tendency to flip equipment suppliers between launches as a cost-cutting strategy, which implicated training needs, and its move towards global technology standards; this representative had been advocating to national union leadership to develop governance structures to oversee these transitions, to reportedly little avail.

The bargaining unit was reported to have a "progressive" reputation; and they reported especially cooperative relations with plant management. For instance, they used a modern operating agreement featuring production job rotation--because of the high degree of automation, production work was relatively repetitive, so rotation helped to reduce fatigue--and they de-emphasized seniority as selection criteria for new roles. And yet, they were relatively traditional with respect to skilled work organization, with reported expressions of opposition to both work reforms.

The union official referred to maintenance teams as a strategy to collapse non-electrical classifications into a broad mechanical classification citing similar efforts at other carmakers, and to reduce AutoCo's skilled workforce more generally. He predicted the loss of specialized knowledge, and emphasized the significant time investment required for skilled trades employees to gain sufficient expertise, including the multi-year apprenticeship followed by years of on-the-job development. Company efforts to promote flexibility undercut these investments. This representative resented the presumption that different classifications could easily rotate tasks among them. Concerns about job boundaries in the bargaining unit were reportedly strong enough to support a lines of demarcation committee, which acted as an enforcement body. He articulated his position like so:

> *It is so important that we maintain specific skills. The other manufacturers are going to […] mechanical work groups, general handymen. […] [AutoCo] want[s] to reduce the number of classifications to one mechanical group […] not to have different skills. But, then that waters down what these guys know.*
> *[…]*
> *[AutoCo] wants to reduce skilled workers; they want to minimize costs; and labor is the easy way to do it. With the mechanical work groups, giving some of their tasks away, they can reduce a few heads. […] I'm against it. I'm about empowering our skilled workforce, and giving them the tools and the knowledge to be as effective as possible. They've been working on this stuff for their careers. They've spent four years going to school to excel at their trade, and then another four years to be experts in it. […] It takes them a long time to retain this knowledge, and really get excellent in what they do.*

Production Minor Maintenance Tasks as Opportunity

Minor maintenance tasks, or autonomous maintenance, redistribute selected lower-level maintenance tasks from skilled trades to production employees. The integrated production work groups, formally introduced in 2011, provide a forum in which to manage these activities. As

evidenced in the following accounts, AutoCo professional staff, along with a segment of national union staff, viewed production minor maintenance as an opportunity. Skilled workers, and their representatives, however, were less enthusiastic.

AutoCo professional staff

Accounts by higher-level AutoCo managers suggest they viewed production minor maintenance as an opportunity on multiple fronts. The most common explanation cited the need to free up skilled employees for more complex work. In general, company officials remarked on the need for steps to help the hourly workforce, especially the skilled trades, meet the skill requirements of new technologies, a view echoed across groups. Again, the company funded a substantial renovation of the national joint training center, where apprentices complete foundational classroom training; they were also aiming to use the facility for continued training for journey workers. The parties also agreed to various curriculum updates incorporating new production technologies, with the greatest updates for electricians. On the company side, AutoCo had recently increased its research and development capacity of advanced manufacturing methods, and had started to integrate 3D printers at selected sites.[36]

Explanations also cited the concurrent need to better leverage production worker knowledge, and deepen their engagement. AutoCo, like other U.S. carmakers, continues to have high absenteeism among hourly workers. The complexity of production work varies across major areas. In final assembly, the most labor intensive, employees marry together components to form a finished car. Cycle times are longer, reflecting more complex ranges of motion. By contrast, in the body shop, operators "feed automation." Jobs tasks are simpler. On the whole, the work is physically and mentally demanding, and features few advancement opportunities. These realities weaken incentives for workers to expend high discretionary effort. AutoCo relies on temporary workers to fill in for absences (or else they rely on certain "off-line" employees, like team leaders and lower-level supervision). The company's use of "temps"—they were between 5 and 10 percent of hourly workers in 2019—is a point of contention for the union, which claims AutoCo keeps them on for extended periods to cut labor costs.

The reported goal for AutoCo's U.S. plants is to mature into the integrated production work groups, the autonomous blended groups that feature production minor maintenance. Participating production workers would be eligible for formal broad-based skills training, to ensure they have the capabilities to safely perform new work. The company formally introduced them in 2011; the training component (along with deference to locally-agreed upon definitions of minor maintenance) was added in 2015. The company and the union had agreed to formally pilot the groups and the new training program at an engine plant starting in 2018.

One employee and labor relations employee explained what minor maintenance aims to accomplish, citing new technology demands:

> *[A]s technology increases […] we need to increase the skill set of our existing trades to enable them to help with new technology. That is what minor maintenance is intended to*

[36] During my fieldwork, informal discussions were ongoing about whether 3D printing tasks should be within the jurisdiction of the skilled trades, or less formally assigned to any particular worker group.

do: number one, to free up some time for them to take on this new work; but also to leverage the skill set of the work that is viewed as traditionally non-skilled.

A lean manufacturing employee similarly emphasized the need to shift the skilled trades towards more complex work, and the positive effects on production workers and productivity. More generally, they viewed PWG as integral to a continuous improvement framework, as recounted below. A second lean manufacturing manager emphasized similar points, and the opportunity for production operators to "react to situations, and have ownership and autonomy over their work."

We're asking operators to become more knowledgeable on how to fix equipment. […] Maybe in the past, adjusting a set screw, you would have called a mechanic. We want to teach you how to use the tools to adjust a set screw, so that you can do it, you can fix the problem quicker, get the machine running quicker; productivity goes up. And, really, we would rather use our skilled trades to focus on something more advanced.

Managerial explanations also emphasized positive performance outcomes. One employee reported that minor maintenance provided an opportunity to resolve issues that production areas often overlooked, slowing cycle times. Others stressed the value of reducing equipment downtime during high-stakes vehicle launches. An employee with launch training involvement stressed the importance of a "reaction plan," and the inefficiencies of waiting for employees to whom tasks are formally assigned rather than tapping the skills of those working within the vicinity of a failure. When asked what prompted use of minor maintenance, and the effect on production operators, another employee responded bluntly that "everything" was "to improve mean time," or "throughput".[37] He further explained the positive effects on product quality and safety—stoppages cause problems because workers will commonly start a new job cycle before having completed the job in progress when the line stopped. He described a common launch scenario that would be aided by minor maintenance:

I have a robot in a plant where we're running a new vehicle. Because the new vehicle's parameters may be a little different, the robot sees something, it stops. Now, it doesn't stop because it crashed; it just […] missed its mark. In a [plant with minor maintenance], I can have that robot back up […] in a minute. In a traditional plant [without minor maintenance], it might be ten minutes. Instead of running ten jobs that hour, I ran one, because I was down with the robot. On a launch it makes a big difference. If you can get the cadence going on the line, the more the line can continue to run, the better quality parts you'll produce, and the safer you'll produce them.

Similarly, a manufacturing engineering employee who was engaged in final assembly during the Midwest plant's recent launch emphasized how production minor maintenance obviates the need to divert engineering attention from core duties. Launch is a high-pressure time for plants; better help from production would speed resolution of failures. He also understood production minor maintenance as an opportunity to transfer control, as follows:

[37] Mean time to repair is a maintenance metric, representing the average amount of time required to repair a failed component

> *Say you have 10 or 15 skill trades guys that have to cover a wide area of issues throughout the day. Instead of me stopping a major problem over here […], we can […] say, 'You know what? We'll give you guys [operators] the power to go and make these changes without us, and we'll come back and check on you to make sure you're okay after you make those changes.'*

National union employees

The importance of job security was paramount among employees from across the three national union departments, quality and performance, skilled trades issues, and supply chain and product sourcing. The more workers there are in secure union jobs, the greater the union's membership and overall position. I conducted my fieldwork in a relatively healthy period for AutoCo, but nonetheless one in which the company restructured and downsized its global salaried workforce. Hourly employment held steady over this period, but was still just over half the level in 2000 when the industry and economy were stronger (see Figure 1). In spite of a common interest in strengthening job security in a relatively fragile environment, however, discussions of production minor maintenance made evident the siloed nature of the union's national tier, and the relative lack of coordination across joint programs.

[Insert Figure 1 about here]

Employees in the national union's supply chain and product sourcing division, or SCPS, viewed production minor maintenance as an opportunity for their members. The SCPS department works to secure product in unionized plants from non-unionized suppliers, preserving the number of production jobs covered by the union. Team members meet regularly with company counterparts to ensure sourcing actions are made according to mutually-agreed upon criteria, and submit business cases for insourcing work from suppliers.[38] At the time of my fieldwork, the department was focused on understanding the types of new product and process technologies that AutoCo was considering adopting, based on industry research and relationships with contacts from manufacturing engineering who engaged frequently with the union. Their primary interest was in understanding the ways the union's majority "non-skilled" workforce, who otherwise faced a dearth of meaningful advancement opportunities in their view, could essentially share in the gains generated by new technologies, in terms of new responsibilities and skill-building.[39]

One employee from the department recounted a story depicting the department's typical process to identify and parse out job tasks for operators. Around the time of our interview, AutoCo was in the process of introducing use of drones to check for repair issues in high areas of plants. The role had been assigned to skilled trades employees. The SCPS department tried to advocate to

[38] The extent to which the union can successfully resist outsourcing is unclear. The union, especially locally, was highly critical of a recent decision to outsource certain parts for two high-selling vehicles—this work would have been done at the Midwest plant. According to the company, the work was outsourced to a supplier because the Midwest plant lacked the necessary equipment to produce the parts at scale.

[39] Formally, the options are: a team leader role; a semi-skilled job; the four-year apprenticeship and the skilled trades; a salaried position; and a union political role. There are also "preferred" off-line jobs, which higher-tenure workers tend to favor and fill. But each of these capture relatively small pools of workers. The apprenticeship program was essentially frozen—accepting no new apprentices—for the decade after the Great Recession. Transitions to salaried supervision are fewer because of workforce reductions.

have production employees operate the drone, and delegate to the associated skilled employees the tasks of viewing the drone footage and assigning repairs. The company official to which they were reportedly advocating the new arrangement decided against it. In the union employee's view, he probably thought the current arrangement was simplest, with one person engaged, instead of two. Further, the process entails "inspection," and "inspection" work is reportedly assigned to skilled employees. He considered it a missed opportunity.

Efforts to redistribute certain maintenance tasks from skilled to production employees essentially represented a system-wide version of the negotiation just recounted. Similar to managerial explanations, SCPS staff members understood that production minor maintenance helped to reduce equipment downtime because it obviated the need to wait for a skilled trades employee. Minor maintenance tasks are not an upskilling opportunity for production workers in and of themselves, in their view; however, they rely on a particular wisdom accumulated through repeated performance of a narrow set of jobs on the assembly line, or tacit knowledge. Production minor maintenance, or "autonomous maintenance," signals to employees that the company trusts them enough to solve certain problems on their own. Another employee from the department remarked as follows:

> *If an operator's on the floor and he's working, and he knows how to troubleshoot the equipment he's working on, then it's going to be more efficient […] instead of having to call a skilled trades over. […] [I]t's going to […] get off and running a lot faster, right? Nobody gets to know the equipment better than the guy that's working on it every day. You start getting the little temperamental things that happen to the equipment, that you know how to troubleshoot; the little basic things.*

This same union official explained how a strategy featuring production minor maintenance requires less costly investment of time and resources, by workers, and by a company under persistent pressure to tighten budgets. Generally, workers enter AutoCo with a high school diploma, an Associate's, or some college. Production operators complete three days to one week of technical training, depending on their job. The skilled trades apprenticeship is approximately 8,000 hours of training, including a combination of formal classroom training and supervised work in the plants. AutoCo's manufacturing division funds the first two years; then plants must fund the second-half out of their individual budgets. This can be a source of strain for plants, as they have to pay for an employee whom they reportedly cannot trust to work autonomously. A higher-level employee of the Midwest plant remarked of apprentices: "I can't really set them free on their own, so I can't really use them, but I don't have them paid for either." In the view of SCPS officials, there needs to be a more meaningful intermediate step between production and the skilled trades, with respect to skills and training. The same employee explained:

> *You can upskill a guy because, first off, the resources for skilled trades people aren't there; and it's […] a step [towards their] advancement, but nothing that's so severe where you need to send someone to school for four years. And that's what we need to be doing.*

Production Minor Maintenance Tasks as Threat

National union employees

The national union was divided on production minor maintenance, and the production work groups, the blended teams of skilled and production workers, to which the company had been aiming to mature. The preceding accounts by SCPS officials indicate they viewed both as opportunities for the union's majority production workforce. By contrast, accounts of employees representing the skilled trades workforce and from quality and performance indicate they viewed minor maintenance, and company justifications that such task redistributions would increase skilled trades' capacity for more complex maintenance work, with reluctance.

Like other accounts, one union employee's description of the blended work groups emphasized positive impacts on equipment uptime, because of worker proximity to the machinery. And similar to the union's position on maintenance teams, this official described the groups as an opportunity for skilled employees to function autonomously. He called the minor maintenance feature, however, the "biggest hurdle to date." Like AutoCo managers, they conceded that training production operators, and broadening their responsibilities, would open up new opportunities for skilled employees, and increase the skill content of their work. With production operators assigned to minor maintenance, skilled employees would be well-positioned for more complex work. However, this employee was skeptical of the company's pledge to sufficiently train skilled employees, and had not observed capital investments commensurate with stated commitments.

The company reportedly aimed to use existing launch training infrastructure to facilitate further training. While stakeholders generally regarded the process's employee involvement dimension positively, multiple employees, hourly and salaried, were critical of the training component, and reported largely cost-driven insufficiencies, like: employees were trained too early in launch, and had difficulty securing "refresher" training; received "canned" vendor training that failed to account for site-specific needs; or were not trained at all. Absent needed investments to offset predicted losses associated with production minor maintenance, or explicit guarantees of job security to plants adopting new practices--instead, job security was tied to product investments, which the national parties agreed to as part of contract negotiations--skilled employees may perceive their jobs to be at risk, as follows:

> *[I]f you take this work away from our trades, then we're concerned that you're going to lay them off. That to date has been our biggest hurdle, because when you work in the plant, and suddenly you start to see your work disappear, a pink slip usually follows.*

Another skilled trades employee in the national union viewed production minor maintenance unfavorably, but accepted the practice with resignation, and conditional on dedicated training and local understanding of its scope (as agreed to in 2015 bargaining). Absent these terms, this official spoke of plants having operators, or "junior journeymen," performing beyond their capabilities, as follows:

> *We said that the company and the union must agree on what that minor maintenance is. And it must show up in the operator instruction sheets, so that production employees are*

not going over and above their training. When it's done like that, I don't have problem with it.

The training he refers to is for production members of the blended production work groups, and emerged from 2015 negotiations. It entails 60-plus hours of broad-based skills training.[40] Participants earn a modest pay increase.[41] Developed by the quality and performance division, the program was modeled on a more substantial approach for production teams at a "progressive" engine plant, where operators reportedly performed tasks typical of electricians, activity considered "taboo" elsewhere, according to the original program's designer, a salaried launch training official.[42] During my fieldwork, a formal pilot of PWG and the new training program were underway at an engine plant, suggesting that both were not widely operational.

Plant employees: elected or appointed union representatives

Recall that the two bargaining units at the Midwest plant approached the skill development of their skilled trades employees differently, with the body and stamping unit more self-sufficient and engaged in continuous training. This is partially attributable to the high degree of automation requiring skilled maintenance. They differed, too, with respect to maintenance teams, with the final assembly unit effectively supporting them since the pilot. The body and stamping unit, by contrast, was unsupportive of teams. However, the two units were similar in terms of their lack of support for production minor maintenance, in spite of supportive language in both local agreements (with one union official in final assembly remarking that the unit must be "really "really, really, really, really careful" about what it deems minor maintenance, so as not limit new opportunities for the skilled trades). There were indications that the final assembly unit had become more flexible about job boundaries over time. And yet, it was an accepted part of the work process in few areas; and eligible tasks were relatively simple. Further, union officials expressed firm opposition to instances in which production operators exceeded their defined responsibilities at all.

One elected representative described how the plant had "relinquished" responsibility of certain minor tasks to production operators, such as removing residue build-up from equipment, which makes them feel "empowered." But a line was drawn beyond those responsibilities, since the scope of an operator's knowledge is too narrow to resolve more than small "tweaks," in the view of this representative. More extensive intervention risks breaking the equipment:

As trade reps and skilled trades, we have to draw the line because that production person, they may very well be able reset something or tweak something […]. But the

[40] For instance, fundamentals, electrical principles, electrical systems and components, lubrication systems, etc. The training venue could be a local community college or online program. The reported goal is to provide employees with skills to spot "issues and abnormalities" in their production workstations. Operators are required to consult visual aids that outline eligible job tasks.

[41] The wage increases come in two phases: employees earn a fractional hourly raise once trained, and receive an additional raise, plus a one-time bonus, once they demonstrate skill versatility

[42] This plant was reportedly on the verge of closing. The union chairperson conceded to new work practices and associated training, in exchange for significant plant investments. In spite of staffing increases, the plant chairperson was reportedly voted out by members. However, the training program has reportedly persisted through multiple chairpersons and plant managers.

> *problem is, do they know every aspect of that piece of machinery, where if you hit the reset three times and it didn't reset, well, now you're actually breaking something.*

However, the same official remarked on the importance of the skilled trades consulting operators before investigating a maintenance issue, because of the tacit expertise the operators develop through close, continual work on the equipment: "They know every sound, every movement […] They spend 10 to 12 hours a day with that piece of machinery. You [skilled trades] may only see it once every six months."

In the view of the final assembly union representative cited earlier, performing across lines of demarcation disrespects or undermines the skilled employee traditionally assigned the work. Further, operators risk injury to themselves and others. As to conditions that prompt production workers to cross into skilled trades work, he cited "unneeded pressure" from front-line supervision to avoid line stoppages. Supervisors rarely wait for the appropriate skilled trades employee to show up, according to him. He explained:

> *They [skilled employees] don't want anybody getting hurt, first of all. […] Second, nobody likes doing somebody else's job. If that's my job, then I need to do my job; and you shouldn't be doing my job, because if you're doing my job, it means you're telling the company, you don't need me.*

Summary

Working within a framework centered on opportunities and threats, I hypothesized how each of the core interest groups—management, the union, and workers, including sub-groups—would interpret the two work reforms at AutoCo, and based on which particular features or consequences, given prior research. Facing different forms of heightened insecurity, how might actors interpret workplace change, and why?

Findings generally support initial predictions about higher-level managers. Facing a competitive business environment, and on the heels of a restructuring, these employees interpreted the work reforms as opportunities for the company to enhance plant efficiencies and productivity. Reducing equipment downtime was cited frequently. A traditionally low-margin industry, but coming off a string of strong sales years, profitability references were rare. At the same time, managers recognized potential worker effects. Selected employees described the redistribution of tasks from skilled to production employees as part of an upward transition in workforce skills, necessitated by technological change. And to that end, the company had recently invested in apprenticeship upgrades, in conjunction with expanded advanced manufacturing research and development. Skilled worker accounts, however, cast doubt on these declarations, as discussed below.

As to front-line managers, findings provide mixed support for initial predictions. There appeared to be front-line acceptance for maintenance teams at the Midwest plant; though one manager's account suggested that current divisions of labor had not deviated significantly from long-

standing norms. At the same time, a more senior supervisor, faced with excessive overwork, viewed the teams as a form of relief, calling team leaders "quasi-salaried."

Amid reductions in salaried supervision, second-hand accounts by national union and high-level managers of maintenance teams elsewhere, however, including at the second pilot location, suggested that process leads, the lowest-rung of salaried employment, and a position one salaried interviewee called the company's worst, were threatened by teams, as they potentially undercut their already precarious role. Further data collection is needed.

As to union interpretations, findings generally support initial predictions: in spite of common interest in strengthening member job security in a fragile economic environment, and one marked by overall union decline, findings indicated largely occupationally-based divisions in regards to reforms altering traditional divisions of labor between skilled and production employees. "Non-skilled" staff in the SCPS division described such efforts as an opportunity for the union's low-mobility production workforce to apply tacit knowledge and share in the gains of technological change. Further, such practices were described as an inexpensive apprenticeship alternative.

By contrast, facing consolidation, contraction, and technologically-driven shifts towards advanced electrical-digital skills, and absent offsetting investments, skilled union representatives were more reluctant about redistributions of tasks over which they had jurisdictional claims historically. As a compromise, national parties in 2015 agreed to formal training and to defer definition of minor maintenance to local parties; but whether the training was widely operational is unclear. In spite of supportive language, Midwest plant union officials in both bargaining units were more stridently resistant to production workers performing tasks traditionally assigned to the skilled trades.

Union parties viewed maintenance teams more positively, with supporters describing them as an opportunity for members to gain control and function autonomously. At the Midwest plant, however, support was split between the two bargaining units: the national union credited the popular final assembly official with the teams' survival; and though this official was strongly supportive, he nevertheless emphasized the importance of remaining alert to other negative changes. By contrast, the skilled trades-heavy body and stamping unit resisted both reforms, including teams, describing them as company ruses to consolidate classifications, dilute skills, and reduce employment.

Skilled team-member interviewees, in reported recognition of the need for progress, were especially supportive of maintenance teams, citing heightened control, deeper involvement, and greater job security, lending support to initial predictions regarding worker satisfaction. The team leader role was likened to a salaried position, a boundary-crossing traditionally frowned upon. More interviews with skilled employees are necessary to confirm these reports.

Notably, while teams were mostly *not* viewed as upskilling or multi-skilling forums—nor were they introduced in conjunction with new technologies—potentially countering certain initial predictions, selected accounts suggested they provided an opportunity to pool knowledge, which many viewed as necessary because of reported skill variability across the skilled trades. National

non-skilled union interviewees perceived production minor maintenance as a mobility vehicle, but did not reference the negotiated formal training from 2015.

Unfortunately, this paper is unable to verify or reject initial predictions regarding worker perceptions of minor maintenance. Given the variation in accounts of maintenance teams by union tier, the national union may be an unreliable proxy for the rank-and-file in this instance. More research is needed to understand responses to work organization changes among operators.

How interpretations relate to resistance

How do the preceding accounts contribute understanding of the low rates of diffusion of the two reforms in the Midwest plant, and across AutoCo more broadly? Specifically, how are they linked with acts of approval or resistance, or refusals to cooperate? As reflected in the accounts, the two main sources of resistance are the skilled trades and local unions in particular.

Shifts in the national contract towards more fluid divisions of labor indicate willingness of the skilled trades to make modest concessions, consistent with their mixed accounts of the reforms. Though the recessionary pressure to acquiesce to maintenance teams in 2009 should not be discounted, the skilled trades' more positive accounts of them relative to minor maintenance are consistent with reports by upper managers of more protracted discussions of the production work groups and featured task redistributions. In light of this resistance, therefore, the lengthy training for operators performing minor maintenance—agreed to in 2015, and designed by quality and performance, a union division which seemed to have to demonstrate national progress towards more flexible divisions of labor while balancing the interests of various worker constituencies, including the skilled trades—might be viewed less as a skill development opportunity than as a bureaucratic imposition, particularly absent clearer pathways upward for trainees, and the reported difficulty in securing training resources in plants. Though the training and work groups were piloted together at an engine plant starting in 2018, parties agreed to close the site in 2019 negotiations. The training's take-up and future therefore are both unclear.[43]

The most consequential resistance to the reforms, however, is from local unions to which work organization decisions are ceded more generally. The source of local power is the strike threat. In spite of strong sales of late, AutoCo is weakly positioned to absorb protracted strife, especially at its largest assembly plants, where hundreds of highly profitable trucks roll off the line each day.[44] Therefore, the need to avoid extended ratification delays leads the national parties to decouple national policy and local practice through flexible language or "deviation" processes for individual plants. This was evident at the Midwest plant, where maintenance teams were operational in one of two bargaining units, consistent with accounts. More broadly, there were doubts among national union parties as to whether maintenance teams were operational outside of a small number of facilities. As to minor maintenance, the 2015 national contract granted local parties authority over its scope. Consistent with reports by union officials—and despite dedicated measures in both local agreements at the Midwest plant—it was practiced rarely.

[43] Workers would be transitioned to a nearby transmission facility.

[44] The most recent U.S. auto strike in 2019 cost the company approximately $450 million per week, and the union's strike fund up to $12 million per week, according to estimates by the Center for Automotive Research.

Most recently, in 2019 national negotiations, after fieldwork ended, the parties agreed that implementation of the production work groups would be a *local* decision, in spite of company aspirations to advance to these structures.[45]

The company encourages local variation in shop-floor routines, especially when such variation helps to accelerate workplace change; but this variation may also cause more traditional practices to become further entrenched, thus thwarting the diffusion of the two work reforms and work organization changes more generally.

DISCUSSION

Insecurity rooted in declining occupational status

Consistent with prior literature advocating a system-wide view of workplace reform and fuller understanding of the contexts surrounding implementation, this paper examined two underused work reforms at a U.S. automaker from multiple organizational perspectives, with the goal of understanding factors limiting adoption. Indicators of heightened pressure, uncertainty, and insecurity underpinned interpretations of the work reforms across core interest groups. Teams were viewed most frequently as opportunities across interest groups. While task redistributions from skilled to production employees were viewed by non-skilled national union representatives as an opportunity for the union's majority production workforce, skilled union representatives across organizational tiers viewed them as threats and resisted. Ultimately, the support of local skilled union leadership seemed to strongly influence adoption.

Possible explanations of the patterns of skilled trades resistance to the reforms— variable support for teams but relatively broad resistance to task redistributions from skilled to production workers—are worth further examination. That they resisted at all is not necessarily new (e.g., Hunter et al. 2002).

Prior literature considers how relatively shorter-term job insecurity, derived from either poor firm performance or enhanced efficiencies arising from new work practices, influence responses to workplace reform. Hunter et al. (2002) considered how the risk of job-loss from plant closure influenced reactions to a modern operating agreement. Theory argues for no-layoff guarantees and longer-term employment relationships to heighten cooperation (Levine and Tyson 1990); other evidence, however, suggests that such protections are unimportant (e.g., Osterman 1995, 2000).

As noted earlier, the company does not provide explicit job security; instead, security is linked indirectly with plant investments. Ratified national contracts commonly feature a plant closure moratorium; this does not preclude plant closures, however, if business conditions require them. While each case is evaluated and managed separately--with local contract language as a basis of decision-making for ways forward--in such instances, workers are often reportedly shifted to a nearby facility; and/or higher-tenure employees are offered early retirement.

[45] Interested plants must receive approval by the national quality and performance leadership.

The national union reported perceptions of job insecurity among skilled trades employees on the whole, as a result of task redistributions to production workers and what they perceived as a lack of offsetting investments by AutoCo on their behalf. At the time of my fieldwork, however, the Midwest plant was in between two relatively high-profile vehicle launches, and there were plans to staff up in preparation for the coming model. Such investments would suggest that workers there had relatively *strong* job security in the short- to medium-term. Nevertheless, both bargaining units resisted task redistributions from skilled to production employees. This suggests that traditional job security may not be sufficient to induce cooperation among some workers.

Then what helps to account for resistance by the skilled trades, if not perceived job insecurity? Based on a multi-stakeholder view of workplace reform, and more textured accounts of context than is captured in prior research, this paper considers how longer-run labor market insecurity, rooted in declining occupational status, may inform actor responses to change. At AutoCo, the reportedly variable quality of the skilled trades workforce may reflect this decline. With a mean age of 53, the oldest of the union, and representing 17.0 percent of hourly workers, AutoCo's skilled workforce had aged and contracted. Several interviewees cited variable capacity for and interest in upskilling, and under-preparedness for skill demand shifts towards electrical and digital technologies. A higher-level manager with extensive training experience denoted three groups among journey-workers: those who are eager to learn; those who cannot learn; and those who are unwilling to learn.[46] While lack of interest in training may be one source of reported variability, findings indicate an uneven, perhaps waning, company commitment to a robust skilled trades workforce. This uneven commitment thus may signal to skilled trades employees, and their representatives, a need to defend the status quo, and resist change.

First, there were recessionary decisions to consolidate classifications and reduce the workforce. Further, there was reported weakness in core training infrastructure. There were mixed attitudes about the quality of the apprenticeship, from which the company disinvested for the decade after the Great Recession by not adding any new apprentices. The 2015 investment in the joint training facility, the site of foundational apprenticeship training, and the associated steps to ensure future waves of new trainees, were both significant steps on behalf of AutoCo's skills trades workforce, and may represent a new positive direction in the company's skill development strategy. Nevertheless, many Midwest plant interviewees were unaware of the modernization—an update national skilled union officials were proud of—despite there being apprentices on site. Further, the changes were spearheaded by a company employee who seemed to possess above-average commitment to the hourly skilled workforce; it was unclear whether his commitment represented the consensus view. A higher-level manager with training involvement called the curriculum "archaic." Further, interviewees reported deficiencies in launch training for the skilled trades, the main upskilling device after the foundational apprenticeship, and difficulty in securing training resources once launches ended and costs shifted to plants, suggesting potential unmet need for training.[47]

[46] A salaried manager from the Midwest plant provided a useful insight into the diversity of the skilled trades population in terms of background, as follows: "Everybody comes from different educational backgrounds. I have skilled trades in here with college degrees. I have skilled trades that I don't even know if they graduated from high school, because they've been here so long. So that's just the real deal thing that you got to deal with here. But you know, we get by."

[47] Interviewees reported cost-driven training deficiencies for production operators during launch, too. Training for production processes associated with new vehicles must often occur while existing production is ongoing (this is

Further, although vehicle changeovers were an opportunity to test new work practices in plants, and in spite of company investments in advanced manufacturing methods and expectations of imminent transformation, the reforms were not necessarily coupled with significant technological advances to incentivize cooperation, as depicted, for instance, in Milkman's (1997) examination of a New Jersey auto plant's modernization in the 1980s, in which a "massive infusion of new technology" increased the share of skilled trades and the complexity of skilled work. Further, where required by the technology, workers crossed job boundaries without hesitation (Milkman 1997: 154). By contrast, maintenance teams were spurred by a global financial crisis. The final assembly unit introduced minor maintenance as part of a late-2000s vehicle launch (unfortunately, the conditions surrounding the implementation of the body and stamping unit's MOA are unknown). AutoCo was using 3D printers at selected sites; and interviewees cited accelerating advances in industrial controls technology, sparking need for more talented electricians. By all accounts, however, recent change had been incremental. As part of the Midwest plant's latest changeover, for example, the company flipped suppliers in stamping to cut costs, which required that electricians acclimate themselves to new tooling; but the complexity of plant maintenance fundamentally did not change.

As to other inducements to cooperate, they were relatively sparse. Maintenance team participants were eligible for a modest pay raise, depending on their classification; any needed training, however, was on the job. Nevertheless, maintenance team participant interviewees cited intrinsic rewards. The lack of complementary measures may have been what skilled union leadership meant when they criticized the lack of commensurate investments on their behalf.

Though company decisions may partially account for weakened skilled trades' efficacy, there are questions about the union's ability to capitalize on resources when provided them. The new higher-paid electrical classification cited earlier is a good example. Despite national agreement in 2015 to fund the new position, take-up was reportedly low. Reasons cited by company and union interviewees were jurisdictional conflict with traditional electricians and plant resistance to cover associated training costs.[48] A national union official conceded that the union could have pushed for broader take-up, but ultimately cited multiple obstacles, including the apprenticeship transitions underway at the time. A primary reason for resisting production minor maintenance—which the company framed as a way to free up skilled trades for more complex work—was perceived lack of commensurate company investment on their behalf. The ICT position however seemed like an earnest attempt to this end. And while reported plant resistance to invest the

called "dynamic training"). For instance, components associated with the new vehicle are integrated into ongoing production. Pressure to meet production targets, however, means there is little room for error or reflection. This means that someone might step in during training and perform the operator's job if they experience difficulty. One higher-level plant manager described this process like so: "And then when you finally do get a car coming down [during a dynamic build], nobody wants to stop the line and let you think about it for a minute, right? You don't even get a minute; you just [have] to do it. And if you don't get it done, then someone steps in and does it for you." Further, workforce "churn" often creates need for additional production operator training once launch budgets expire (churn has multiple sources, including union job-changing rules, absenteeism, plant reallocations, etc.); but, again, plant interviewees reported difficulty in securing post-launch training resources.

[48] For instance, while troubleshooting a machine, ICTs often performed traditional electrical work, which was prohibited. Further, plant management reportedly preferred to select the higher-skilled ICTs for overtime maintenance, thus limiting lucrative overtime opportunities for traditional electricians (including in some cases employees with greater seniority).

necessary training funds must not be discounted, the position was at least partially subverted by existing jurisdictional concerns internal to the skilled trades, suggesting the potential for the union to undermine their self-interest.

Thus, whether because of company cost-cutting or union missteps, the traits or qualities which traditionally entitled the skilled trades workforce to special treatment had potentially become more variable. In the face of narrowing external labor market options, this may have led them to embrace a strategy defending the status quo.

Their reported ability to resist change is thus all the more surprising, since they appear to have done so from a relatively compromised collective position, in terms of skill and training effort. One would expect for their monopoly over certain work to rest on a foundation of high skill and training effort; cracks in the foundation weaken the legitimacy of their jurisdictional claims. This would account for why the fiercest resister of the work reforms among interviewees was a skilled union official from a bargaining unit with a disproportionately high share of skilled workers and self-sufficient training center with capacity and plant management support to continuously train skilled employees during and after launches. This official worked to maintain sufficient training resources, and to project unit strength and cohesion. By contrast, the other bargaining unit, with proportionately fewer skilled employees, and which lacked a self-sufficient, continuous skill development culture, was slightly more embracing of change, of maintenance teams specifically. But the findings suggest that the greatest source of the skilled trades' collective power may not be the sharpness or relevance of their skills per se; rather it is the union itself and the associated closure tactics it permits (Piore and Sabel 1984).

These findings have implications for the high performance literature. Evidence points to rising skill and training effort during the time firms started introducing high performance work reforms. Findings from AutoCo suggest that these potentially complementary training investments may have dropped off at some point, which may help to partially account for their low overall diffusion. Data showing a decline in the incidence of employer-provided training over the 2000s, with the largest percentage declines occurring among workers with less than a college degree, are consistent with this account (Waddoups 2016), though more recent data are needed to get a fuller understanding of the landscape and recent trajectory of employer-provided training (Osterman 2019). Nevertheless, findings suggest that a parallel investment in the ongoing skill development of the skilled trades workforce--versus traditional employment security measures--could induce greater commitment among them to new work practices. Importantly, this finding is somewhat at odds with foundational Industrial Relations theory (Barbash 1964, Perlman 1928), which argues that, motivated by a "consciousness of scarcity of opportunity" (Perlman 1928: 6), workers' central concern is job security. However, facing an external environment they perceive as constantly shifting and insecure, workers instead may favor measures that promote their ongoing skill development, and hence their continued competitiveness in the labor market.

One commonly reported reason for a lack of company commitment to training is cost. According to union officials, the company fails to appreciate the necessary trade-offs, and how relatively substantial training investments in the shorter-run could leave the company better off in the long run. Such disinvestment could also reflect company understanding of a changing labor market. For instance, they may be seeking to avoid validation of certain long-standing divisions of labor.

We know, however, that the company approved the 2015 apprenticeship curricula updates, which adhered to long-standing core skilled divisions of labor. But the data make it difficult to distinguish these different reasons. Deeper understanding of the factors employers consider in training decisions would be useful. For instance, there is evidence to suggest employers may be favoring an approach that shifts costs to the public sector (Osterman 2019).

These findings also suggest that future investigations of implementation of new work practices, especially if they are occurring in traditional workplaces, with higher-tenure workforces on average like AutoCo's (especially its skilled trades workforce), should consider worker insecurity in its multiple forms, specifically the potentially more enduring labor market insecurity (Lowe 2018).

Unfortunately, this paper provides an incomplete picture of the role of front-line managers in the diffusion of core work reforms, teams especially. Floor manager interviewees in the final assembly unit of the Midwest plant were largely supportive, though one manager reported a tendency to honor traditional lines of demarcation when assigning maintenance work, a potentially apolitical, inertial force that may slow implementation. The second manager, reporting excessive work hours, welcomed the opportunity to delegate work to his more senior hourly supervisees. Consistent with prior examinations of teams (Batt 2004), second-hand accounts of implementation at other AutoCo sites, however, suggested overt management resistance. This is unsurprising given the reportedly steady reductions in the salaried workforce across AutoCo U.S. plant operations. One reason that Midwest plant managers perceived the maintenance teams more positively could have something to do with the relatively secure product investments promised the Midwest plant. Economic conditions in the other plant were unknown. It is possible, however, that it lacked similar product commitments, thus placing some managers in a more tenuous position. Additional research of this evidently vulnerable workforce segment is needed to better understand what informs their perceptions and responses to workplace reform.

LIMITATIONS

There are several limitations to this study. Most importantly, it lacks critical first-hand perspectives from rank-and-file production employees and front-line supervisors, two especially vulnerable worker groups at AutoCo. In general, the sample is weighted heavily towards AutoCo higher-level salaried managers in the central corporate organization and salaried plant employees. Further, additional interviews are needed with hourly employees from the body and stamping unit, from both union leadership and the rank-and-file, to help verify collected accounts.

Further, the results may be less generalizable outside of large, multi-site, unionized manufacturing firms. An important question concerns the extent to which some of the observed dynamics can be attributed to the union. Union workers and employees are known to have sharp differences not only with employers, but with each other, too (Barbash 1967). Future research should test a similar framework in a non-union setting. Further, future research aiming to test these questions in a similar setting should broaden the sample to a greater number of sites--

including less automated sites, with relatively fewer skilled trades employees; and more automated sites, with relatively greater numbers of skilled trades--to determine whether reported perceptions and responses to new shop-floor work practices reported here were being driven by unobserved factors. Findings suggest that the relatively self-sufficient body and stamping unit, in terms of its skill development infrastructure and norms, may have been anomalous.

CONTRIBUTIONS AND FUTURE RESEARCH

Through examination of interpretations of two work reforms at a U.S. auto plant, and their variation across critical interest groups, distinguished by organizational position, division, and occupation, and the contexts informing their choices, this study deepens understanding of individual and group responses to new forms of work organization and to factors that may negatively affect their introduction and survival across U.S. firms more broadly. Further, through more textured accounts of resistance from a historically powerful and tradition-steeped constituency of the U.S. auto industry and labor movement, and of surrounding contexts, than is captured in prior research, this paper provides deeper insight into other forms of insecurity informing actor responses to workplace change—not job insecurity but deeper labor market insecurity rooted in declining status. This has implications for which complementary measures might induce greater workforce commitment in firms trying to advance work organization changes, with findings pointing to employer investment in their employees' continuous skill development as one potential option; but in such scarcely resourced and generally volatile business environments, it is unclear whether companies are positioned to offer such complementary measures to any meaningful extent.

In general, this study contributes to the relatively small body of literature that applies a political framework to understanding implementation of new work forms in organizations. The findings have implications for unions, companies, and further research. By forcing the company to engage a decoupling strategy (Meyer and Rowan 1977), the union demonstrates its considerable power, in spite of other indicators of overall decline. The skilled trades in particular appear able to exert considerable power, in spite of possible declines in their overall skill and training. Second, findings suggest that the occupationally-based fault lines of industrial unions—which were sources of division in the U.S. labor movement's early years—endure (Zieger 1995). Given their long-term decline, unions must determine how to reasonably reconcile different group interests internally, or else they risk alienating younger rank-and-file members. As to skill-building, while something like production minor maintenance is not the only viable solution for expanding opportunity for the majority production workforce, continued adherence to traditional divisions of labor may threaten to set back their skill development, during a time when companies are nervous about shifting skill demands of new technologies that will be needed to remain competitive. Further research is required here to better understand the interdependencies.

Further, this paper sheds light on the high-pressure working conditions of contemporary front-line managers, a workforce segment lacking union protection on the one hand, and the perks of corporate life on the other. Evidence points to rising precarity among them (e.g., Cappelli 2008). Additional research is needed to deepen understanding of this segment. Similar to unions,

companies must ensure they do not neglect this increasingly vulnerable group, and erode their working conditions so much that they undermine their production goals.

Further, this paper's exploration of how different groups interpret task redistributions on the shop floor contributes to the sociology of occupations and professions literature, which documents institutional level practices (Abbott 1988, Weeden 2002), but features relatively fewer investigations of workplace-level interactions (Bechky 2003). Lastly, this work potentially contributes to future of work discussions by highlighting the bureaucratic structures, and embedded group interests, with which firms adopting new technologies must contend, suggesting that job and skill outcomes of technological change are not pre-determined or fixed.

APPENDIX

Table 1: Sample affiliation

Affiliation/entity	Number of employees
AutoCo	40
Union	5
Total	45
AutoCo	
Non-union (salaried)	30
Union (hourly)	10
Corporate	19
Midwest plant	21
Non-union (salaried)	11
Union (hourly)	10

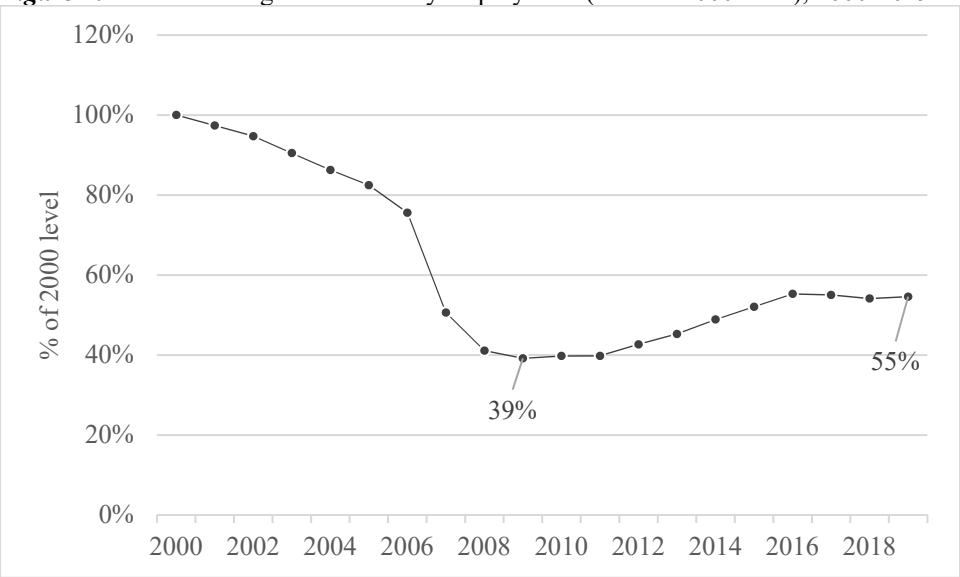
Table 2: Timeline of key changes to work practices in recent national contracts

	2003	2007	2009	2011	2015	2019
Minor maintenance tasks	Skilled trades operational effectiveness letter encouraging greater local flexibility	Letter refers to "minor maintenance actions." Lists eligible task categories	--	Formalizes PWG structure, a forum for minor maintenance. Formalizes production team leader role	Outlines ~60-hour PWG training program and wage increase. Minor maintenance must be agreed to locally via visual job plans	Cedes decision-making authority over PWG implementation to local parties
Maintenance teams	[Same as above]	Letter provides that employees in mechanically-related skilled classifications may help colleagues	Launches mechanical teams pilots in two plants, including in Midwest plant final assembly unit	Formally launches teams. Eligible mechanical classifications are machine repair, toolmaker + template maker, plumber-pipefitter, millwright	Adds electricians. Changes name to maintenance work teams. Clarifies maintenance team leader role	--

Sources: Ratified national contracts between AutoCo and the labor union; joint program documentation; and employee interviews

Notes: The two most recent contracts, from 2019 and 2015, are publicly available on the union's website; earlier contracts are unavailable and were provided by the national union's research department upon request

Figure 1: AutoCo average annual hourly employment (as % of 2000 level), 2000-2019



Source: AutoCo and AutoCo union

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