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Powers and Practices in Labor Standards Enforcement

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Abstract

Wage theft remains a widespread problem in the U.S. In response, worker advocates have pushed for stronger laws to deter violations and promote compliance with wage-hour laws. Having such laws "on the books," however, may not be enough to compel compliance. As many scholars and observers have noted, state departments of labor often fail to use the full extent of their authority to conduct vigorous enforcement. This raises an empirical question: to what extent do enforcement agencies use the various tools in their toolbox, and what are the implications of this use and nonuse for wage theft? This paper draws upon a novel national survey of U.S. state departments of labor, new measures of the strength of state minimum wage laws, and estimates of minimum wage violations to answer these questions. The researchers conclude by outlining a research agenda into the misalignment between statutory powers and enforcement practices.

INTRODUCTION

Despite a strong U.S. economy and historically low unemployment, *wage theft* – the failure of employers to pay their employees the full amount they have earned and to which they are legally entitled – remains a persistent and widespread problem. Recent studies have found that minimum wage violations—only one type of wage theft—affect about 17 percent of low-wage workers per year. These workers lose on average 20 percent of the income to which they are entitled, or about $3,000 per year (Cooper & Kroeger 2017; Fine *et al.* 2020; Galvin 2024). Examining all fifty states plus D.C., Galvin (2024, 73) found that about 4.2 million workers lost $12.8 billion per year between 2010 and 2021 and nearly $155 billion in the aggregate to minimum wage violations alone. Because 77 percent of these workers were supporting at least one child (two on average), this loss of income meant that wage theft pushed these workers below the poverty line. The relative magnitude of these losses is enormous. In 2019, the FBI reported that robberies cost Americans a total of $482 million; burglaries cost a total of about $3 billion; larceny theft cost $5.9 billion, and motor vehicle theft cost $6 billion, for a total of over $15 billion.[1] That same year, minimum wage violations cost American workers over $18 billion (Galvin 2024, 74).

To address this "problem from hell" (Fine 2012), advocates have focused on strengthening state employment laws, including increasing available damages and penalties for minimum wage violations. The assumption underlying this strategy is that when the penalties for violation are greater, employers will be more likely to comply with the laws (Ashenfelter and Smith 1979; Chang and Ehrlich 1985; Weil 2005). There is empirical support for this assumption: states with minimum wage laws that allow higher penalties and damages and that facilitate private litigation are associated with lower rates of minimum wage violations (Galvin 2016). But there is also evidence that having these laws "on the books" may not be enough to compel compliance. Another important factor related to employer compliance is the agency's use of its statutory authority to conduct effective enforcement.

For example, a year after the enactment of a constitutional amendment to add mandatory treble damages for wage theft in Ohio in 2007, then-Governor Ted Strickland (a Democrat) issued an executive order that agencies should waive penalties for first-time violators or those with procedural violations. The state department of labor complied with the order and the minimum wage violation rate returned to its pre-constitutional amendment level (Galvin 2016). Despite the existence of the law "on the books", its practical application was more important.

This distinction between the strength of the enforcement provisions of the laws themselves (what we refer to as "powers") and how they are applied (what we call "practices") appears at the federal level as well. The U.S. Department of Labor, for example, can issue liquidated damages – additional money due to employees in addition to back wages if employers are found to have violated the law – but it does not always assess such damages to employees. In 2012, fewer than

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[1] https://ucr.fbi.gov/crime-in-the-u.s/2019/crime-in-the-u.s.-2019

1 percent of cases included liquidated damages. Despite a shift in agency practices over the ensuing years, only about 30 percent of cases included liquidated damages by 2022-2023 (Stansbury 2024).

This lack of alignment between statutory powers and enforcement practices suggests a new set of questions about regulation: first, how widespread is this misalignment? What are the implications for regulatory enforcement outcomes? And finally, how do we explain the misalignment between authority and practices?

This paper draws on difficult-to-obtain data to explore the relationship between state-level statutory authorities and agency enforcement practices. We illustrate the prevalence of the misalignment between statutory authority and state-level enforcement practices and use estimates of minimum wage violations to examine the negative effect of this misalignment on workers' wage outcomes.

We find that many states do not do what they can legally do, and tellingly, when we account for both powers and practices in examining rates of minimum wage violations, enforcement practices are more strongly correlated with a lower incidence of wage theft than powers alone. However, when we interact the two measures, the association of each with minimum wage violations is contingent on the other: when statutory authority is minimal, enforcement practices have little effect. And, perhaps more surprisingly, when enforcement practices are minimal, statutory authority is ineffective as well. Only when a state has both strong statutory powers and vigorous enforcement do we see a statistically significant and substantively meaningful decline in the minimum wage violation rate.

We conclude with a proposed framework and research agenda for explaining the existence of this type of misalignment, drawing scholarly attention to the factors that may make agencies more or less likely to leverage their statutory authority to improve enforcement.

LITERATURE REVIEW
Embedded in existing theories of compliance is the assumption that regulatory agencies have the legal authority they need to engage in effective enforcement *and* that they will utilize that authority in their day-to-day practices. For example, Ayres and Braithwaite's (1992) solution for addressing the various motives of regulated businesses is an "enforcement pyramid" in which businesses are subject to "escalating forms of regulatory intervention" that begin with education and persuasion, advance to warning letters and then to civil penalties, and when none of this is effective, criminal penalties and ultimately license revocation. An implicit assumption of this well-known model is that a) agencies have the power to conduct various forms of enforcement as they ratchet up to significant punishment and b) that they are willing and able to use those escalating enforcement practices. Empirical work, however, has shown that agencies may or may

not have the powers they need and, importantly, there is no guarantee that even if they do have those powers, they will use them (e.g. Barkow 2016). Compliance monitoring and repeat interactions with violators, for example, are extremely rare.

Scholarship on regulation and implementation suggests an array of factors that contribute to how an agency develops its practices (van der Heijden 2021). Drawing from this literature, one might consider that the misalignment of powers and practices might stem from a similar set of factors, including regulators' philosophy about regulation (punitive deterrence vs cooperative compliance); organizational cultures in agencies that encourage narrow rule-following vs. more discretion and creativity; the failure to build and leverage strategic capacity; resource constraints (limited budgets and staffing); political pressures; relationships with constituencies that incline regulators toward forbearance (Holland 2016); lack of access to information or expertise on innovative practices and strategies; regulatory capture (relationships with regulatory industries leading to lax enforcement in the industry's favor); public engagement in the regulatory process; and technological developments that encourage certain types of regulatory approaches.

Lipsky (1980) still provides perhaps the clearest acknowledgment of the gap between powers and practices within theories of regulatory enforcement. According to Lipsky, street-level bureaucrats – public service workers such as labor standards investigators "who interact directly with citizens in the course of their jobs, and who have substantial discretion in the execution of their work" (3) – effectively "make policy" through both a) the discretion they exercise on a case-by-case basis and b) the way their collective actions produce agency behavior, as perceived by those with whom they interact. In other words, investigators must regularly make tough decisions as to how they use their limited time and resources on the job, and these decisions may accrue to form tendencies about how an agency does its work and its reputation.

More recently, scholars have observed that the managers in public agencies that oversee the work of street-level bureaucrats also play a crucial role in supporting those agents as they navigate challenges, potentially improving both their performance and well-being. Managers, Møller and Grøn (2024) show, are instrumental in "activating street-level workers' professional knowledge and building supportive communities, with the purpose of supporting professional uses of discretion, conscientious prioritizations, and the ability to handle moral dilemmas and emotional strain." While this scholarship helpfully illustrates the role that managers play in both advising and shaping the work of street-level bureaucrats, it largely does not address how these managers carry out a task that is key to understanding the degree of alignment between powers and practices: the development of agencies' organizational policies and routines regarding practices. Some agency managers are responsible for systematic decisions about the practices and policies within an agency; Shepherd and Fine (2024), for example, find that these systematic decisions are more important in determining the practices of an agency than the individual decisions of investigators.

A new wave of thinking around enforcement – often called "strategic enforcement" – involves precisely this type of manager-led policymaking. Scholar and former Department of Labor Wage and Hour director David Weil, for example, has argued that labor enforcement is in need of serious renovation. After years of economic restructuring, many workplaces have "fissured" as firms have shifted many of their internal activities to outside organizations to lower expenses and limit liability by converting employer-employee relationships into arm's length transactions (Weil 2014). This occurs through subcontracting, franchising, third party management, use of temporary employment agencies, and misclassification of workers as independent contractors. When large companies shift to these practices, legal liabilities are shifted onto smaller firms at the bottom of the industrial food chain where profit margins are tighter and the pressure to cut costs is very strong. While contracting has always been an issue in the agricultural and garment industries and in construction, Weil's account shows how fissuring went mainstream and spread across many sectors.

Fissuring has complicated enforcement and made it very hard to pursue widespread and impactful enforcement. The firms at the top of the food chain often set standards for employment practices and dictate the terms to subcontractors, even though they are not the direct employers and thus not the legal entity directly committing the violations. The lack of legal liability of these lead companies (what is referred to as joint, or "up-the-chain" liability) means that the enforcement of these policies too often leaves what we would call the "big sharks" free to roam and conduct business as they please while leaving the least resourced and least powerful "minnows" caught in the net.

To address fissuring, Weil developed the concept of strategic enforcement "to use the limited enforcement resources available to a regulatory agency to protect workers as prescribed by laws through changing employer behavior in a sustainable way" (Weil 2018, p. 437). Under this paradigm, labor standards offices should not simply wait until a worker has complained, but use data and analysis to identify the types of workplaces, often based on industry, where they have reason to believe violations are common, and use that information to proactively launch targeted, "directed" investigations.

Building on Weil, and drawing on their work with state and local agencies, Fine and Round (2021) argue that strategic enforcement is best understood as a series of practices that agencies might engage in, which include: triage processes that allow agencies to prioritize resources toward the most egregious, impactful and/or high risk complaints; mapping priority industries to identify industry structure, influential employers, and widespread, noncompliant industry practices; conducting company-wide (rather than single-complaint) investigations; issuing subpoenas for key documents; exploring joint employment or upstream liability; holding successors and individuals liable; assessing high damages and penalties to deter future violations;

undertaking robust collections efforts; employing an aggressive press strategy aimed at incentivizing widespread compliance; and monitoring compliance even after collections are made. Most agencies can do triage, mapping, press, and compliance monitoring without express statutory power; in some cases, the ability to undertake these practices is explicitly set forward in statutes. In other cases, the ability to conduct such practices is not expressly prohibited, meaning that proactive agencies can take the initiative to design and implement strategic enforcement practices.[2]

To what extent do regulatory agencies take advantage of their statutory authority to design and carry out strategic enforcement? Do stronger powers and more vigorous enforcement practices make a difference in workers' ability to collect the wages they are owed? These are the questions to which we now turn.

DATA

To empirically examine the alignment of agencies' statutory enforcement authority and their enforcement practices and explore the implications of this (mis)alignment for the effective enforcement of minimum wages laws, we created two novel datasets. The first measures the statutory authority (powers) of U.S. state departments of labor; the second measures U.S. state agencies' enforcement practices.

Measuring State Department of Labor Statutory Authority (Powers)

To measure state enforcement powers – the legal authority granted to some body to carry out enforcement of minimum wage laws within the state – our research team hand-coded the minimum wage statutes of all 50 states and Washington, D.C. as of the years 2018-2022. Drawing on theory and experience (e.g., Ashenfelter & Smith 1979; Round 2018a; Round 2018b; Goldman 2018; Weil 2018), we pre-determined the number points to allocate to 31 statutory provisions. Statutory provisions were then grouped into two categories: "probability of detection" and "costs of noncompliance" to mirror the theoretical model developed by Ashenfelter and Smith 1979. The first category tallied all statutory provisions granting the state enforcement agency its investigative authorities and the second tallied the penalties, damages, fines and fees that the state agency or a court could assess when employers were found liable for minimum wage noncompliance. The composite measure of *powers* (statutory authority) then weights each category equally.[3] This effort drew and expanded upon a similar effort undertaken by Galvin (2016) to register the strength of state laws in 2013. Categories, points, and weights are listed in **Appendix A**.

Measuring State Department of Labor Enforcement Practices

To measure enforcement practices among state departments of labor, we fielded a novel survey of state-level labor standards enforcement agencies in all 50 states and D.C. in 2022-2023. Email

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[2] We return to this point in the Conclusion.
[3] Pearson's correlation of the two components = 0.51, p<0.000.

lists for distributing the survey were drawn from personal contacts, agency websites, and phone calls to the agency to identify the correct person within each agency to fill out the survey. The survey inquired into current agency practices (2022-2023). Four agencies were not responsive despite being contacted multiple times. The final response rate was 91%.[4]

We collected information on four types of canonical strategic enforcement practices associated with scaling the impact of enforcement: proactively initiating investigations regardless of a specific complaint (outside of child labor violation cases); conducting company-wide investigations in response to individual complaints; having a procedure for decisions about prioritizing complaints (also referred to as triaging complaints); and regularly investigating reports of retaliation.

A separate survey question asked whether agencies regularly assessed civil penalties, liquidated damages, fines and fees, and remedies for employer retaliation against workers – and if so, whether those assessments were typically on the high, medium, or low end of what was authorized by law.[5] These questions established the extent to which agencies used the monetary sanctions available to them when employers violated the law under the assumption that levying larger sanctions would be more likely to produce changes in employer behavior. Responses were coded for whether the agency carried out these practices and to what degree (see **Appendix B**).
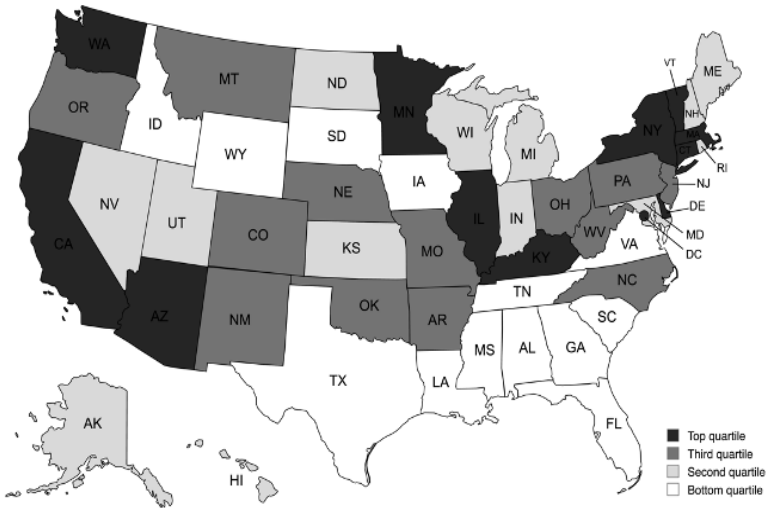
Like the measure of statutory powers described above, *practices* is a composite score that equally weights two categories of practices that theoretically enhance the agency's "probability of detection" and raise the "costs of noncompliance" (Ashenfelter and Smith 1979). The first category includes: proactive investigations, company-wide investigations, complaint triage, and retaliation investigation. The second includes the assessment of liquidated damages, civil penalties, fines and fees, remedies for retaliation.[6] Figures 1 and 2 illustrate the geographic variation in state enforcement *powers* and *practices*.

Figure 1: Statutory Powers Scores

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[4] Response rate refers to 41 of 45 agencies. States that lack minimum wage laws and/or enforcement agencies were given zeros (AL, FL, GA, LA, MS, and SC). The states that were not responsive include: AZ, DC, IA, and NE. The research team made multiple attempts to contact state agencies who did not respond to the survey.

[5] Civil penalties refer to the monetary fines imposed by the government or courts on employers who violate labor laws; liquidated damages are a predetermined sum of money that an employer agrees to pay an employee if the employer breaches the wage payment terms of an employment contract or law; remedies for retaliation against employees who assert their labor rights can include reinstatement, promotion, back pay, compensatory and punitive damages, and other legal or equitable relief.

[6] Cronbach's alpha for the *practices* construct is .80, which is generally considered good internal consistency among included items, meaning that the items are reliably measuring the same underlying construct.

Note: The measure of statutory enforcement authority (powers) is composed of agency powers and authority (50%) and available penalties, damages, and fees (50%).

Figure 2: Enforcement Practices Scores
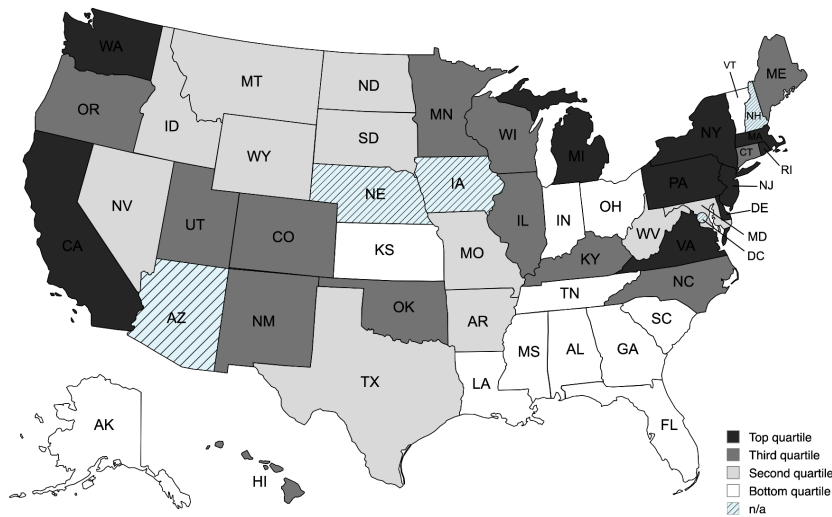
Note: The measure of enforcement practices is composed of proactive investigations, company-wide investigations, complaint triage, and retaliation investigation (50%); assessment of liquidated damages, civil penalties, fines and fees, remedies for retaliation (50%).

Dependent Variable: Minimum Wage Violations

To examine the relationship between our enforcement measures and the key outcomes of interest (compliance with the applicable minimum wage), we set out to estimate the incidence of minimum wage violations.

Measuring the scope and depth of minimum wage violations is difficult. No single data source systematically and reliably tracks the incidence of this form of wage theft and records the precise amounts of money that are not paid. Early studies of minimum wage compliance used data provided voluntarily by employers to the Bureau of Labor Statistics (e.g., Zucker 1973), but employer-reported data is not reliable, as employers who violate the law cannot be trusted to report that information to government agencies.

Workers can report wage theft by filing lawsuits and/or lodging complaints with federal, state, and local enforcement agencies, but lawsuit and complaint data provide unreliable portraits of the actual number of violations. Lawsuits are often too expensive for minimum-wage workers to initiate, and lawsuits are filed by only a small fraction of the workers who experience wage theft (Gleeson 2016). Complaint data is also problematic because those who are more likely to be exploited are also more likely to be unaware of their right to complain (whether due to language barriers, lack of information and knowledge, or fear of retaliation, termination, or deportation). We must therefore turn to alternative methods to more accurately detect and measure violations.[7] Survey data on hours and earnings are invaluable in this regard, as they enable us to estimate the true underlying incidence of wage violations indirectly.

We use Current Population Survey Merged Outgoing Rotation Groups (CPS-MORG) data, which the U.S. Department of Labor's Wage and Hour Division uses to identify "priority industries" for investigations and which remains the top choice of every social scientist who has sought to develop national or industry-specific estimates of FLSA noncompliance since the 1970s.[8] CPS-MORG has many advantages: it is gathered via extensive interviews with around 60,000 households per month; it is representative at the state and national levels (unlike other survey data, such as the Survey of Income and Program Participation [SIPP]); and its individual-level responses permit us to estimate earnings and minimum wage violations relatively easily.

Minimum wage violations are thus dichotomous measures of whether an individual's estimated hourly wage was lower than the applicable legal minimum. We use state minimum wage rates for each respondent as of the date (month) effective. We exclude from the analysis any respondents who can be identified as exempt from their state's minimum wage law based on their industry, occupation, and income level. All analyses, including population estimates, use survey weights and cluster standard errors by state.

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[7] The respondent-driven sampling method used in three cities by Bernhardt et al 2009 is not feasible to replicate across the United States.

[8] Ashenfelter and Smith 1979; Ehrenberg and Schumann 1982; Sellekaerts and Welch 1984; Trejo 1991, 1993; Weil and Pyles 2005; ERG 2014; Galvin 2016; Cooper and Kroeger 2017; Fine, Galvin, Round, and Shepherd 2020; Clemens and Strain 2022; Galvin 2024.

The biggest downside with the CPS data, as with any survey, is measurement error. We take steps to address measurement error but fully acknowledge that it still exists (Clemens and Strain 2022). These steps include the following: (1) Because measurement error is likely greater when the researcher must calculate hourly wages by dividing reported weekly earnings by the reported hours worked, we confine our analysis to hourly workers who report their hourly wage.[9] (2) Tips and commissions usually count toward the minimum wage but overtime wages do not. Unfortunately, CPS-MORG lumps together overtime, tips, and commissions into a single variable, preventing us from distinguishing tips and commissions from overtime earnings. We therefore restrict our analysis to workers who do not report earning overtime, tips, or commissions. This errs on the side of caution, as it excludes from the analysis workers who are not properly receiving the tips and commissions they have earned. Notwithstanding this restriction, we still find that industries with large numbers of tipped workers – such as food services and drinking places and personal and laundry services -- are among the highest-violation industries, which suggests that the violations suffered by tips- and commission-based workers in these industries go beyond tip-stealing and lost commissions. (3) To reduce measurement error on the extreme tails of the wage-hour distribution, we exclude respondents who report wages of under $1 per hour and/or $10 per week and who usually work less than 10 hours per week. (4) We conduct sensitivity tests, including calculating minimum wage violations as only those wages that are more than $0.25 below the state minimum wage. Results are extremely similar.[10]

These adjustments notwithstanding, we caution the reader to treat point estimates as rough (and arguably conservative) measures that are most useful for comparative analyses across jurisdictions and over time. Indeed, despite concerns regarding measurement error in self-reported wages, there is no reason to expect that reporting errors will differ systematically across states or over time.

RESULTS

***Empirical Relationship between Powers and Practices***

We expect *powers* and *practices* to be highly correlated. As discussed above, the premise of most existing literature is that administrative enforcement agencies will design enforcement practices that make use of their statutory authority. For example, it is assumed that agencies empowered by law to assess damages and penalties will, in fact, assess damages and penalties. According to deterrence theory, the higher the expected costs of noncompliance and the greater the probability of detection, the more likely the employer is to comply with the law (Ashenfelter and Smith). If state agencies do not systematically assess those damages, the presumed link between expected costs and employer behavior is broken.

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[9] This likely contributes to making our estimates conservative, as many non-hourly workers who are paid by the project, by piece-rate, or in irregular lump sums have a high likelihood of being illegally underpaid.
[10] For more on measurement error in the CPS and our methodological approach, see **Appendix C**.

Our measures of *powers* and *practices* are indeed positively correlated (p<0.000). The Pearson correlation coefficient, which measures the strength and direction of the linear association between two variables, is r(47) = 0.56, p<0.000. (See Figure 3.)

Figure 3: Relationship Between State Enforcement Powers and Practices
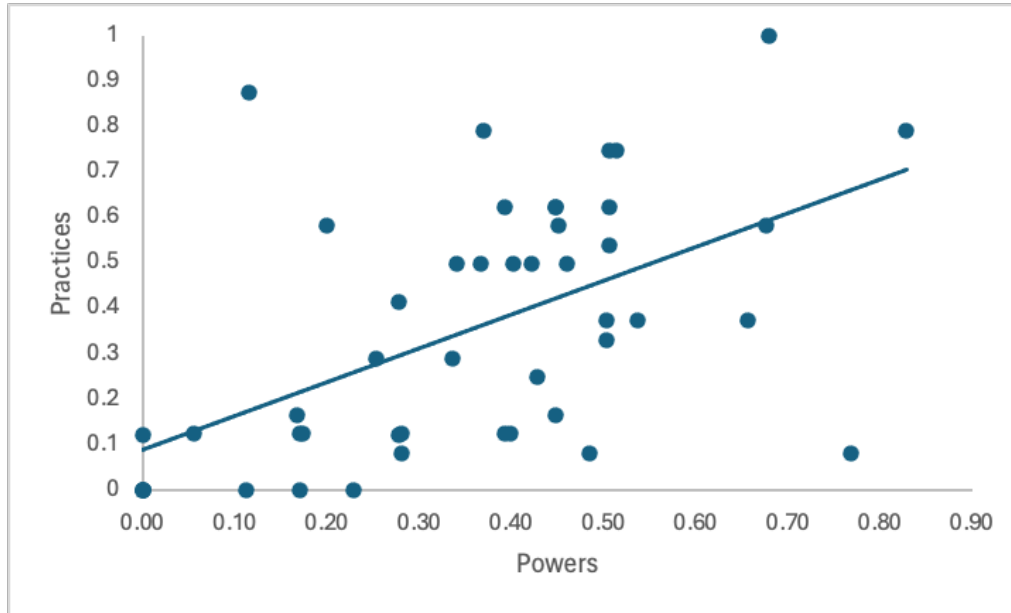
This is a moderately strong relationship, but given theoretical expectations that statutory authority should be accompanied by practices that make use of that authority, it is surprising that the relationship is not even stronger.

The explanation, as it turns out, is that many agencies do not take advantage of the powers and authorities that are "on the books." (See Figure 4.) We find that:

- Of the 27 state agencies that have the statutory authority to conduct proactive investigations (rather than only respond to complaints), only 10 (37%) actually do on a regular basis.[11]
- Of the 25 state agencies that have the statutory authority to conduct company-wide investigations (rather than investigate only the complainant), only 15 (60%) actually do.[12]
- Of the 29 state agencies that have the statutory authority to investigate retaliation, only 7 (24%) actually do.[13]
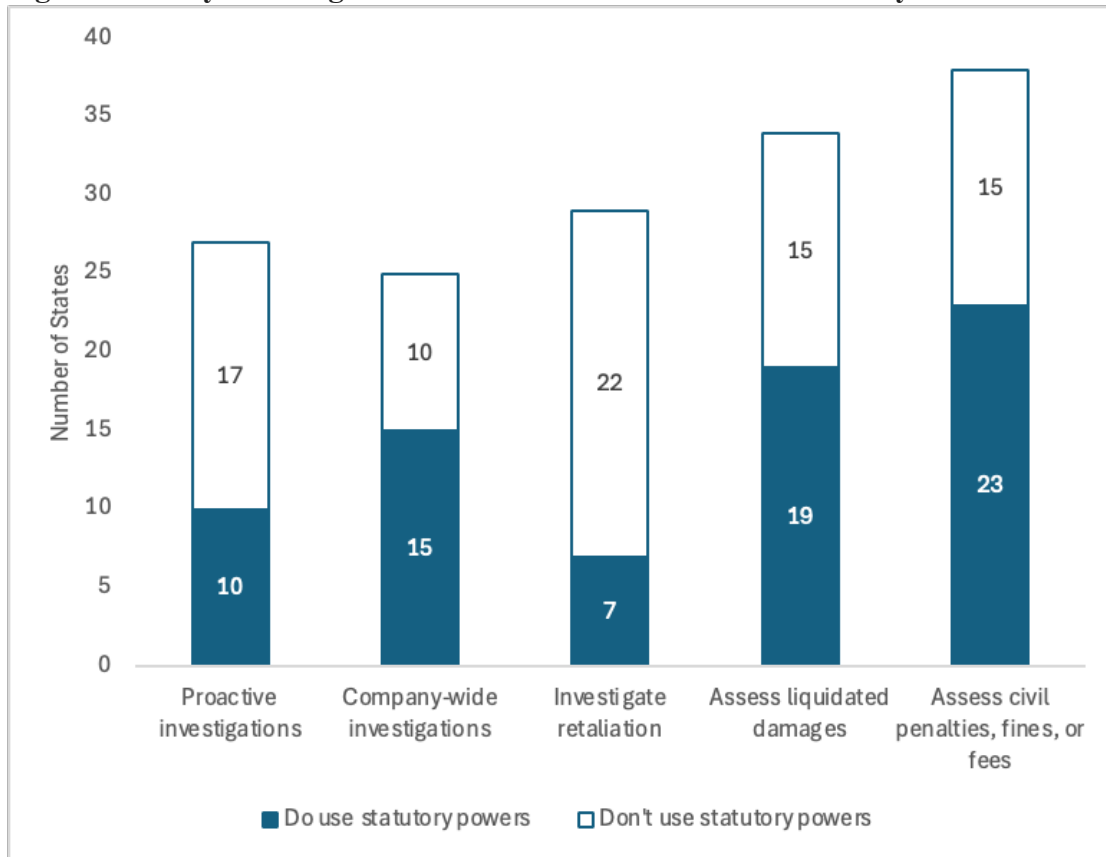
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[11] Agencies in AZ, DC, and NE have the statutory authority but did not respond to our survey. The 10 state agencies that do regularly use their statutory authority to conduct proactive investigations include CA, CO, CT, ME, MA, MN, MT, NJ, OR, and RI. Six state agencies report that they have undertaken proactive investigations a few times before but do not do so regularly; they include: IL, KY, NH, PA, WA, and WV.

[12] Agencies in AZ, DC, and NE have the statutory authority to conduct company-wide investigations but did not respond to our survey. The 15 state agencies that regularly use their statutory authority include: CA, CO, KY, MA, MI, MN, MO, MT, NH, NJ, NY, OR, PA, RI, and WA.

[13] Agencies in AZ and DC have the statutory authority but did not respond to our survey. The 7 state agencies that use their statutory authority to investigate retaliation include: CO, DE, IL, MA, MI, OR, WA, and WI.

- Of the 30 state agencies that have the statutory authority to assess liquidated damages, only 19 (56%) actually do. Of those, only 9 (30%) report regularly assessing damages "at the high end of what is allowed by law."[14]
- Of the 38 state agencies that have the statutory authority to assess civil penalties, fines, or fees, only 23 (61%) actually do. Of those, only 7 (18%) report regularly making assessments "at the high end of what is allowed by law."[15]

Figure 4: Many State Agencies Fail to Make Use of their Statutory Powers and Authorities

The failure of many agencies to take advantage of their statutory powers is puzzling, but it may not necessarily negatively affect workers. Employers in states with higher penalties and stronger

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[14] Agencies in AZ, DC, IA, and NE have the statutory authority but did not respond to our survey. Only 9 of the 19 state agencies report regularly assessing liquidated damages at the "high end of what is allowed by law." These 9 states include: CA, HI, MD, MI, MN, NM, OK, UT, and VA. Seven state agencies report regularly assessing liquidated damages at levels "about in the middle of what is allowed by law" include: AK, IL, MA, MT, NJ, NY, and OH. Three state agencies report regularly making assessments "at the low end of what is allowed by law" include: AR, KY, and ME.

[15] DC and NE have the statutory authority but did not respond to our survey. The 7 state agencies that report regularly assessing fines, fees, or civil penalties at the "high end of what is allowed by law" include: CA, HI, MI, NJ, OK, UT, and VA. Nine state agencies report making regular assessments "about in the middle of what is allowed by law," including: DE, IL, MA, MN, NY, PA, RI, VT, and WA. Eight state agencies report making regular assessments "at the low end of what is allowed by law," including: AR, CO, KY, ME, NJ, NM, WV, and WI.

powers may well internalize the costs of noncompliance and act accordingly by complying with minimum wage standards. Alternatively, the lack of enforcement in practice may cause employers who realize that there are no 'cops on the beat' to reduce their compliance with the law. The relationship between powers, practices, and the incidence of wage theft is thus an empirical question. Do stronger statutory powers, more robust enforcement practices, or both lead to fewer violations? That is the question to which we turn next.

Relationship between Agency Enforcement Powers, Practices, and State Minimum Wage Violations

We begin with descriptive statistics. Between 2021 and 2023, we estimate that over 7 million hourly workers[16] suffered a minimum wage violation. Among these workers, the average reported hourly wage was $11.09. Had these workers earned their state's minimum wage, they would have earned, on average, an hourly wage of $13.15 – amounting to an income loss of $2.06 per hour on average, or 16% of what these workers were owed. The smallest average hourly income loss was in Alaska ($0.87 per hour) and the highest average hourly income loss was in South Carolina ($4.42). While an estimated income loss of 16% may seem high, it is comparable to other published estimates (Bernhardt et al. 2009; ERG 2014; Galvin 2016; Cooper and Kroeger 2017; Galvin 2024). Massachusetts had the highest minimum wage violation rate (12%), likely a reflection of its steep increases in the minimum wage during this period, and the lowest was Utah (nearly zero), likely due to its stagnant ($7.25) minimum wage amid increases in the market wage over time due to inflation.

To empirically test the relationship between minimum wage violations and our measures of state enforcement authority and practices, we fit an individual-level logit model to CPS-MORG data in which the dependent variable is a binary measure of whether the respondent reported hourly earnings of less than the applicable state minimum wage by month. Our key independent variables include the measures of state agency enforcement *powers* and *practices* described above. We use person-level "earner study" sampling weights for each observation, metropolitan statistical areas as our strata, and states as our primary sampling unit in order to approximate CPS's multistage stratified sampling design while clustering standard errors at the state level.[17]

Because states in the U.S. differ in so many ways – their economies, their demographic compositions, and so on – control variables are necessary when making cross-state comparisons. We control for age, sex, race, citizenship, education, industry, union membership, full/part-time worker, paid by the hour, private/public sector, married, and metropolitan and central city status, all of which are from CPS-MORG. We also control for the year and the state minimum wage rate, since higher state minimum wages are strongly and positively associated with higher violation rates (Clemens and Strain 2022). Following Clemens and Strain (2022), we also account for variation in macroeconomic conditions across states. These measures include the

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[16] Excluding individuals who earn tips, overtime, or commissions; work less than 10 hours per week; or earn less than $10/week or $1 per hour.

[17] Following Clemens and Strain 2022; Cengiz, Dube, Lindner, and Zipperer 2019; Autor, Manning, and Smith 2016.

statewide median house price index (logged), from the Federal Housing Finance Agency; aggregate state income per capita (logged), from the Bureau of Economic Analysis; and the unemployment rate by state-month, from the Bureau of Labor Statistics.[18] To account for ideological differences across U.S. states – which may affect the propensity of employers to comply with the minimum wage – we use Warshaw and Tausanovich's (2022) measure of aggregate state public ideology in 2020.

Finally, we control for the number of staff positions budgeted for minimum wage enforcement per capita in 2018, collected in our survey and supplemented with data that was generously shared with us by *Politico* for their 2018 report on wage theft (LeVine 2018). This serves as a proxy for each agency's level of resources and administrative capacities. If measures of state enforcement authority and practices are associated with minimum wage violations above and beyond this proxy for agency resources and capacity, we may conclude that effective enforcement requires more than larger budgets and more "cops on the beat."

Before presenting the results, we caution that our analyses to not permit us to make causal claims about the relationship between enforcement capacity (powers and practices) and minimum wage violations. Minimum wage violations are the product of many factors. We control for as many of these as possible given data availability and degrees of freedom in an effort to isolate the independent impact of enforcement capacity on the likelihood of being paid less than the minimum wage in a given state. However, we readily acknowledge that there are still unobserved factors at the state, firm, and individual level for which our analyses are unable to account. The present research strategy aims to provide a first examination of the new data we have collected. Observational regression analysis can help to detect relationships and gauge the role that enforcement may play in shaping outcomes above and beyond demographic, economic, and political factors. Finding a statistical relationship between key variables of interest provides a reasonable basis for proceeding to the next steps of the research process. Subsequent work can more thoroughly investigate the strength of the relationship; provide more information about heterogeneity in the relationship across states; specify and test causal mechanisms; and consider the role of context and history in shaping the relationships of interest. For now, we seek only to test the basic relationship between variables, drawing upon theory to guide the analysis.

Table 1 displays the four models.[19] The first assesses the relationship between minimum wage violations and our measure of state enforcement *powers.* As is evident in Table 1, this relationship is negative and statistically significant at $p<0.05$. This means that greater statutory authority is associated with a lower likelihood of experiencing a minimum wage violation. The second model assesses the relationship between minimum wage violations and our measure of state enforcement *practices.* This relationship, too, is negative and statistically significant at $p<0.01$. States with agencies who report using their statutory authority in practice have a lower

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[18] States and selected areas: Employment status of the civilian noninstitutional population, January 1976 to date, seasonally adjusted. https://www.bls.gov/web/laus.supp.toc.htm

[19] These models take the aforementioned steps to account for measurement error, implement state-specific minimum wage exemptions, and focus on the period 2021-2023.

minimum wage violation rate. Notably, the use of effective enforcement practices is not simply a matter of the resources and capacities of the enforcement agencies. Agents' actual *use* of their statutory authority – their enforcement "practices" – have an independent effect on violation rates above and beyond the agency's resources (as proxied by the number of investigator positions).

Model 3 includes both variables in a multivariate regression to assess the relative significance of each measure; now, *practices* seem to dilute the strength of the association between minimum wage violations and enforcement *powers. Powers* is still significant but only at p<0.1; *practices* is significant at p<0.05.

TABLE 1: Powers, Practices, and their Interaction Predict Minimum Wage Violation Rate Declines (2021-2023)

	(1)	(2)	(3)	(4)
Powers	-1.059**		-0.814*	0.112
	(0.412)		(0.420)	(0.476)
Practices		-0.565***	-0.400**	0.270
		(0.198)	(0.178)	(0.280)
Powers#Practices				-1.520**
				(0.590)
Controls	X	X	X	X
Constant	-1.780	-3.993	-2.911	-5.410
	(6.261)	(6.624)	(6.499)	(6.610)
Observations	141,692	141,692	141,692	141,692

Standard errors in parentheses
*** p<0.01, ** p<0.05, * p<0.1
Note: Controls include age, sex, race, citizenship, education, married, metro, industry, union, full/part time, private/public sector, more than one job, works for same employer as did last month; housing values (logged); per capita income (logged); unemployment rate in the previous month; state minimum wage; year; investigators per capita in 2018; and a measure the mass public's ideology in each state, based on a multilevel regression and post-stratification (MRP) model of state ideology (Warshaw and Tausanovich 2022).[20,21] Models are logistic regressions using only non-exempt hourly workers who do not earn overtime, tips, or commissions and excludes respondents reporting <$1/hour, <$10/week, and <10 hours/week.

Finally, Model 4 examines the interaction of powers and practices to assess whether the statistical significance of state enforcement practices depends on the value of our measure of statutory powers, and vice versa. There is reason to expect an interaction effect. When agencies conduct enforcement, having stronger statutory powers (e.g., higher penalties, damages, and fines) should

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[20] Significant controls across all four models include: state minimum wage (+), year (-), female (+), age (-), Black (+), Other race (+), foreign born and non-citizen (+), born abroad of US parents (+), more education (-), union member (-), part-time (+), single, separated, or spouse absent (+), unemployment (+) and log median house price index (-).
[21] Christopher Warshaw and Chris Tausanovitch, 2022, "Subnational ideology and presidential vote estimates (v2022)", https://doi.org/10.7910/DVN/BQKU4M, Harvard Dataverse, V1.

enhance the effects of those enforcement practices. Conversely, when statutory authorities are weaker, the effects of enforcement practices should be weaker as well. Likewise, the impact of statutory powers may well depend on the extent of agency enforcement practices. Interpreting the significance, magnitude, and direction of the coefficient of the nonlinear interaction effect in Model 4, however, is not straightforward; it requires the use of marginal effects and is best illustrated graphically (Mize 2019). As shown in Figure 5, the effect of each variable does indeed depend on the value of the other; *powers* and *practices* have a "joint" effect that is not due to random chance.

Figure 5 Relationship between Interaction of Powers and Practices and Minimum Wage Violation Rate (2021-2023)
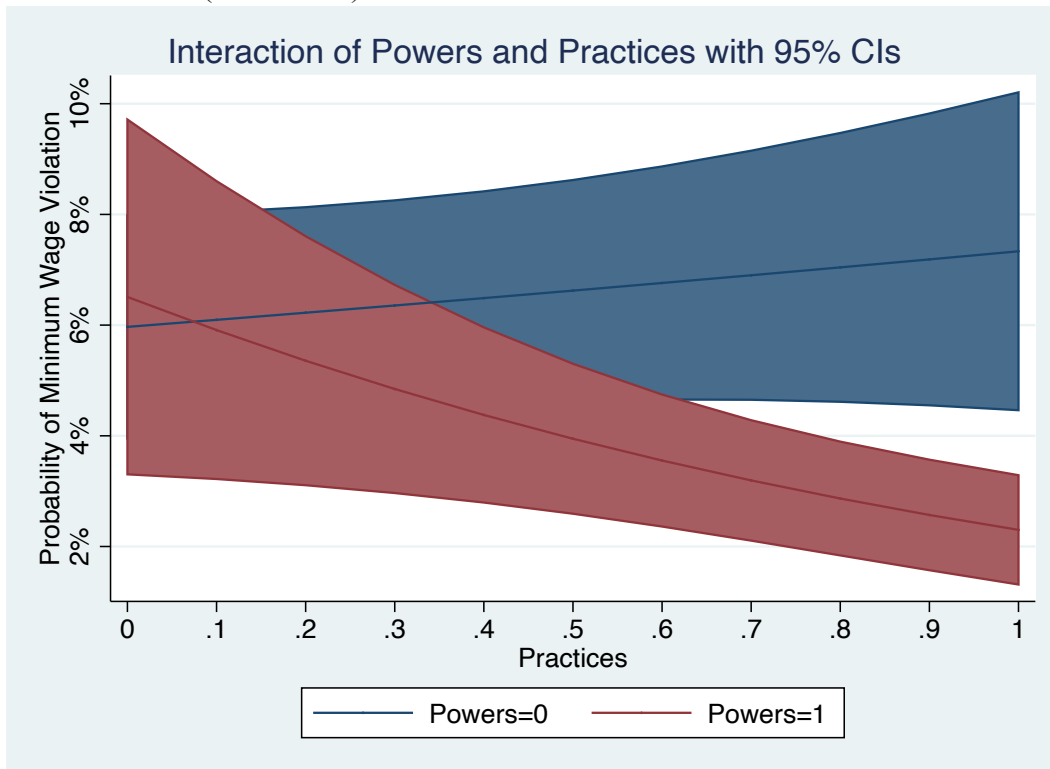
Note: The horizontal x-axis represents enforcement practices ranging from a score of zero, meaning it does not conduct any enforcement, like Alabama, to 1, meaning it undertakes comprehensive enforcement practices on every dimension measured, like California. The vertical y-axis represents the predicted minimum wage violation rate. The blue line plots the predicted relationship between statutory powers and the violation rate when the state has a powers score of zero (no state enforcement agency, no penalties). The red line plots the predicted relationship between powers and violation rate when the state's powers score is 1 (every possible power and authority).

Figure 5 illustrates the interaction effect of powers and practices using average marginal effects at different values of our two key measures. As shown, statutory authority (powers) is statistically associated with lower rates of minimum wage violations only at above-average values of our measure of enforcement practices—that is, when enforcement practices are more vigorous. Likewise, enforcement practices have no effect without statutory powers to back them up. Only when a state has both strong statutory powers and vigorous enforcement is there a statistically significant and substantively meaningful difference in the minimum wage violation rate: one

moves from a 5.9% probability of violation (no powers, no enforcement) to 2.3% (strong powers, strong enforcement). The interaction term, in short, indicates that we need both strong statutory powers *and* vigorous enforcement practices if we are to see a meaningfully lower violation rate.[22] The foregoing analyses naturally raise the question: which practices matter most? We examine this question in **Appendix E**. However, in our experience, states that have recently introduced strategic enforcement practices have tended to create unique "bundles" of practices suited to their contexts and capacities. Because each combination of practices may affect the efficacy of enforcement, we caution against thinking about, and measuring, individual practices outside the context in which they are enacted. Future research ought to conduct a more comprehensive analysis of the co-occurrence of practices across contexts.

The findings presented here provide the first systematic empirical evidence that agencies may be able to improve the effectiveness of their enforcement simply by making use of the powers and authorities granted to them by statute by raising the costs of noncompliance (by assessing the penalties available to them) and increasing the probability of detection (by undertaking strategic enforcement practices).

DISCUSSION

After collecting novel data on state department of labor enforcement powers and practices, we assessed the degree to which the two are related within states. We find that having stronger laws protecting workers is associated with stronger agency enforcement practices (a correlation of $r = 0.56$). However, there are many states where agencies have express statutory authority for specific enforcement practices but they do not report using that authority. None of the key strategic enforcement practices are regularly used by more than 60 percent of states who have the express authority to conduct such practices (and some, like regular investigations into retaliation, are used by far fewer states). Our data collection provides a map of the states for which there is more and less misalignment. We then test the independent effects of state enforcement powers (statutory authority), practices (based on a survey of agency practices), and minimum wage violations. We find that enforcement practices are negatively associated with minimum wage violations independently (controlling for enforcement capacity), when statutory authority is considered, and even condition the negative association between minimum wage violations and state enforcement powers (the interaction effect). We suggest that this finding supports the claim that having strong statutory authority to enforce minimum wage laws may not be sufficient. To robustly enforce minimum wage standards, state enforcement agencies must also enact practices that support those standards.

In our analyses, we find that moving from a state with no enforcement agency (such as Alabama) to a state with a full slate of statutory enforcement powers and implemented enforcement practices (Massachusetts and California come the closest to this scenario) is associated with a 3.6 percentage point decline (61% decline) in the likelihood of experiencing a minimum wage violation.

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[22] Robustness checks of the interaction term are summarized in Appendix D.

To illustrate the relative magnitude of the relationship between enforcement and probability of a minimum wage violation, it is helpful to consider different types of commonly advocated interventions. Consider "workforce development," including education, training, and upskilling, which is often put forth as the most promising policy pathway toward improving workers' earnings and career options and making them less vulnerable to wage theft. Using education attainment as a proxy for the effect of the types of outcomes provided by workforce development programs, we find that more education – especially a high school diploma and a bachelor's degree – is indeed associated with a reduction in the probability of minimum wage violations, net of controls. The difference in the probability of experiencing a minimum wage violation between an individual with no high school diploma and an individual with a high school diploma is significant – a 3.2 percentage point difference – as is the difference between those with bachelor's degrees and those with high school diplomas (a 2.1 percentage point difference). However, neither the effect of earning a high school diploma nor a bachelor's degree is as large as the effect of shifting from a state with no statutory protections or enforcement to a state with strong statutory protections that are implemented in practice (3.6 percentage points).

Increasing labor union membership is another oft-discussed method of enhancing workers' bargaining power, protecting their rights, and improving their wages. However, labor union membership provides only a 1 percentage point improvement in one's probability of experiencing a minimum wage violation, all else equal.[23]

We might also consider the relative magnitude of the effect of statutory protections and enforcement practices compared to characteristics and experiences we know to be make workers more vulnerable. Non-citizens who work in low-wage U.S. jobs, for example, are particularly vulnerable to wage theft. We find that workers with U.S. citizenship are 0.9 percentage points less likely than non-citizens to experience a violation when one includes all relevant controls – however, the effect of citizenship is also substantially less than the 3.6 percentage point decline due to strong *powers* and *practices*.

CONCLUSION

Minimum wage noncompliance is one of the most pernicious forms of wage theft, as it affects the poorest and most vulnerable workers. When minimum wage workers are underpaid by even a small percentage of their income, they face major hardships such as being unable to pay rent or childcare or put food on the table. Minimum wage violations also distort the market, giving a competitive advantage to those employers who do not play by the rules, which can create a race to the bottom in high-violation industries as employers compete to save on labor costs. Minimum wage violations have broader implications as well; they contribute to widening income

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[23] Non-unionized workers have a minimum wage violation rate of 4.5%; union members have a violation rate of 3.5%. That said, unionized workers made up 6.9% of the workforce earning at or below the minimum wage and suffered only 6.3% of all violations, which indicates that their violation rate was lower than one might have expected.

inequality, racial and gender inequities, wage stagnation, reductions in the amount of tax revenue collected, and increasing reliance on public services, which strains government budgets. Our work is motivated by the goal of better understanding how the enforcement of minimum wage standards can identify, punish, and even deter this form of wage theft.

The empirical analysis in this paper is based on collecting novel and hard-to-obtain data on the specific practices of state labor enforcement agencies and on rigorous coding of all minimum wage statutes in all 50 states and D.C., updating and expanding Galvin's (2016) efforts in this area. Using these data, we provide evidence of the extent of variation in the *use* of enforcement authority among state agencies. Far from being able to assume that strong legal enforcement authority translates into an agency's use of that authority, we find that agency enforcement practices themselves need to be a topic of investigation.

A Powers-Practice Paradox: A Framework and Research Agenda

Given the widespread assumption in theories of enforcement that regulatory bodies use the legal authority they are granted to develop and apply their enforcement practices, we might call instances where regulatory agencies fail to make use of their statutory authority to carry out legally permitted enforcement practices the *powers-practices paradox*.[24] This paradox appears in many cases of administrative enforcement beyond employment standards (e.g., Miles 2020) and thus suggests a more general line of inquiry. Our empirical analysis raises the question of what explains the observed variation in enforcement agency's use of their statutory authority. This is a topic that can be a rich area of future study.

The powers-practices paradox may emerge in three types of scenarios, each of which may entail different agency processes. Statutes and regulations might:

1) *require* practices that are not followed
2) *permit* practices that are not undertaken
3) *not prohibit* practices that are nevertheless not attempted

In the first scenario, the failure to follow legally mandated practices may indicate the presence of strong political or public pressures against vigorous enforcement of the law leading to non-enforcement or underenforcement. In the second scenario, the failure to conduct enforcement practices that are expressly permitted by law—as when agencies do not assess penalties for employer violations of laws—is common. This may result from regulators whose governing philosophies are opposed to such practices; from a lack of resources or expertise; or from political or public pressure against using permitted enforcement strategies. In the third scenario, agencies may not attempt enforcement practices that are not prohibited because they are unaware

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[24] Legal scholarship refers to what we call the powers-practices paradox *underenforcement* (e.g., Barkow 2016).

of them or lack the necessary expertise. We would expect that this scenario occurs most frequently among agencies that lack information, imagination, or are unconnected to communities of learning and practice.

In all three scenarios, then, there may be many reasons an agency does not make use of their statutory authority. In addition to the suppositions above, we know that many agencies inherit a large backlog of cases that regulators feel must be addressed before the agency can implement a strategic shift in practices, even if such changes would benefit the agency and its constituents in the medium- and long-term. Other agencies may be actively counseled against using their enforcement powers by state attorneys general or may be led by individuals who are politically or legally cautious about implementing their statutory authority. Or, there may be administrative hurdles to implementing practices that promise to scale the impact of enforcement.

There may also be pressure from elected officials, explicit or implicit, to exercise restraint and not penalize employers who violate minimum wage laws. Indeed, even when elected officials are publicly supportive of worker protection legislation, they may be wary of allowing agencies to use the full set of enforcement tools at their disposal lest the elected officials become the target of backlash from discontented employers (who are often politically connected, influential in elections, and regular donors to campaigns). Agency non-use of statutory authority may therefore be the result of what Holland (2016) refers to as *forbearance*: politicians' deliberate and revocable nonenforcement of law that sanctions some constituency in order to preserve votes. Though Holland (2015, 2016) examines this phenomenon predominantly in terms of the nonenforcement of laws disadvantaging the poor—in strategic efforts to reap electoral gains from nonenforcement—we suggest that this concept may be equally fruitful in understanding the gap between law and practice in the case of labor standards regulation.

Further research into the conditions under which agencies are more (and less) likely to align their enforcement practices with their statutory powers is necessary to help leaders and staff in enforcement agencies, as well as workers' rights advocates, to undertake reforms that can more effectively advance both stipulated legal goals (the robust enforcement of minimum wage standards) and substantive goals (improving general welfare).

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Appendix A: Measure of State Statutory Authority (Powers)

Statutory authority granted to state enforcement agency (50% of powers measure):

- Enforcement by state agency (1), attorney general (0.5), or both (1.5)
- Agency has unfettered access to documents (1)
- Agency has unfettered access to place of business or employment (1)
- Agency can require interviews/testimony (1)
- Agency can do company-wide investigation (not just single employee) (1)
- Agency can do directed (i.e. proactive) investigations (1)
- Agency can enforce/implement law independently/make final determinations? (1)
- Agency or court can issue injunction/stop order (1)
- Penalties/fees used to fund agency? (1)
- Agency can bring court action to seek remedies on behalf of employee (1)

Penalties, Damages, Fees (50% of powers measure):

Damages:
- ER liable only for back wages owed, % of wages, interest, or < amount (0)
- ER liable for double damages (back wages + an additional equal amount) (1)
- ER liable for treble damages (back wages + twice the underpaid wages) (2)
- ER liable for quad damages (back wages + three times the underpaid wages) (3)
- ER must pay interest (1)

Discretion in awarding damages?:
- Damages are mandatory (1)
- Agency has discretion (0)
- Good faith excuse or bona fide dispute = (-1)
- Must be willful, egregious, or repeat offender = (-1)

Penalties/Fees:
- Misdemeanor or Prison (1)
- Interference with investigations (1)
- Highest amount is over $5,000 (2)
- $1,001-$5,000 (1)
- <=$1,000 (0.5)
- Additional subsequent penalties (1)
- Each week/day constitutes a separate offense (1 or 2)
- If penalty requires criminal conviction (point deductions, -1)

Discretion in awarding penalties:
- Penalties are mandatory (1)
- Agency has discretion (0)
- Good faith excuse or bona fide dispute (-1)
- Must be willful, egregious, or repeat offender (-1)

Measure of State Enforcement Practices

Investigations (50% of measure):

- Proactively initiate investigations (vs respond only to complaints received)
- Conduct company-wide investigations
- Triage complaints

- Investigate retaliation

Assessment of penalties (50% of measure):

- Liquidated damages (is assessment typically on the high, medium, or low end?)
- Civil penalties (is assessment typically on the high, medium, or low end?)
- Fines and fees (is assessment typically on the high, medium, or low end?)
- Remedies for retaliation (regularly assess?)

Appendix B: Measure of State Enforcement Practices

Question	Text	Points
Agency	Please tell us which state and agency you work for.	
Company-wide investigations	Does your agency ever conduct a company-wide investigation into a workplace when you receive a complaint at that workplace? -"Yes, we do this now" -"No, we currently investigate on the specific complaints we receive"	[0, 1]
Directed (proactive) investigations	Does your agency conduct directed (or proactive) investigations, where you identify target industries or employers regardless of whether you have received a specific complaint (excluding child labor cases)? -"Yes, we now do this regularly" -"Yes, we have done a few times before but we do not do it regularly" -"No, we have never done this"	[0, 0.33, 1]
Triage complaints	Does your agency have a procedure for making decisions about which complaints to prioritize for investigation (triaging complaints)? -"Yes, we have a procedure for prioritizing complaints" -"No, we investigate all complaints in the order in which they were received"	[0, 1]
Investigate retaliation	Does your agency regularly investigate allegations of retaliation? -"Yes, we regularly investigate retaliation cases" -"No, we do not and have not regularly investigated retaliation cases"	[0, 1]
Liquidated damages	Does your agency regularly assess any of the following against employers for violations? - Liquidated damages/Other penalties paid to the worker -"Yes, we regularly assess these" -"No, we do not regularly assess these" If yes: "We are interested in the amounts offices assess employers for violations. Currently in your agency, are assessments against employers for violations generally at the low end, about in the middle, or at the high end of what is allowed by your laws?"	[0, 0.33, 0.66, 1]
Fines/fees	Does your agency regularly assess any of the following against employers for violations? - Fines/Fees -"Yes, we regularly assess these" -"No, we do not regularly assess these" If yes: "We are interested in the amounts offices assess employers for violations. Currently in your agency, are assessments against	[0, 0.33, 0.66, 1]

	employers for violations generally at the low end, about in the middle, or at the high end of what is allowed by your laws?"	
Civil penalties	Does your agency regularly assess any of the following against employers for violations? - Civil penalties -"Yes, we regularly assess these" -"No, we do not regularly assess these" If yes: "We are interested in the amounts offices assess employers for violations. Currently in your agency, are assessments against employers for violations generally at the low end, about in the middle, or at the high end of what is allowed by your laws?"	[0, 0.33, 0.66, 1]
Retaliation remedies	Does your agency secure remedies to workers when their employers are found to have retaliated against them? -"Yes, we regularly secure remedies for retaliation cases" -"No, we do not and have not secured remedies in retaliation cases"	[0, 1]

Appendix C

Estimating Minimum Wage Violations

Measurement Error

        There are reasons to believe that measurement error in the CPS may generally downward-bias the estimates of minimum wage violations. First, despite going to great lengths to reach them, both Hispanics (Latinx) and undocumented immigrants are underrepresented in the CPS. Because workers in these groups are at higher risk of experiencing minimum wage violations, the estimates of violations reported here may be overly conservative. Second, Bollinger finds a "high over reporting of income for low-income men" driven by "about 10% of the reporters who grossly over report their income," thus potentially biasing estimates downward. Third, CPS data have a shortage of low-wage workers and an excess of high-wage workers relative to comparable survey data like SIPP; one effect of this imbalance could be to underestimate minimum wage violations. Roemer does find that the CPS reaches more "underground" workers than other large-scale surveys and is less biased than alternatives. But given the high rates of violation discovered in the Bernhardt et al. 2009 innovative survey of hard-to-reach workers in the "informal" labor market—higher than the estimates presented here—there is reason to suspect that these findings underestimate the prevalence of minimum wage violations across the board. These considerations notwithstanding, the fact that measurement error surely exists recommends using caution when working with the point estimates reported.

        To address measurement error and conduct sensitivity tests, following ERG (2014), Galvin (2016), and Cooper and Kroeger (2017), we:
- Exclude unemployed and self-employed workers
- Exclude all observations of workers not specifying hourly/nonhourly status
- Exclude observations of nonhourly workers with weekly earnings less than $10
- Exclude observations of workers with hourly wages less than $1
- Exclude respondents with reported hours less than 10 per week
- Exclude respondents who report earning "overtime, tips, or commissions"
- Exclude respondents with imputed hours
- Exclude proxy respondents
- Violation only if less than applicable minimum wage minus $0.25 (sensitivity test)

Estimated violation rates remain extremely similar in all sensitivity tests.

Data

We use the IPUMS CPS-MORG abstracts generated by Flood et al. 2020.

State minimum wages by month are from Vaghul and Zipperer (2022).

Appendix D

Robustness checks

The above analyses treat any reported hourly wage that is less than the applicable statutory minimum wage (by state-month) as a violation. Some respondents, however, may round their wages when reporting them to the CPS. To account for this type of measurement error, we re-ran all the above analyses with minimum wage violations calculated as $0.25 less than the applicable minimum wage. The results were substantively the same and nearly identical.

Likewise, when we include all workers – including non-hourly workers and those earning overtime, tips, and commissions – all of whom are excluded in the above analyses to account for measurement error – our results are substantively extremely similar.

Those earning less than $1 per hour, $10 per week, or working less than 10 hours per week are excluded in every model; the inclusion of these observations, however, does not alter the results.

Interestingly, there is no evident relationship between powers, practices, and the "severity" of minimum wage violations (measured either as a continuous measure of unpaid wages or as a share of the state's applicable minimum wage by month). This may be because the average amount lost is highly sensitive to both the level at which the state has set its minimum wage and whether the minimum wage has been increased in the recent past (Clemens and Strain 2022).

Interaction terms are known to be more sensitive to model specification and sampling issues. To check the robustness of the interaction of powers and practices, we conducted two cross-validation procedures.

First, we used bootstrapping – random sampling with replacement – to estimate the distribution of the interaction term. After 100 replications, the interaction term is found to be quite robust. It is never indistinguishable from zero and the average coefficient is -1.63 – slightly larger than in Model 4 – with a median p-value of $p < 0.013$. The distribution of coefficients is displayed in **Figure A.1**.

Figure A.1: Distribution of Interaction Coefficients (Bootstrap)
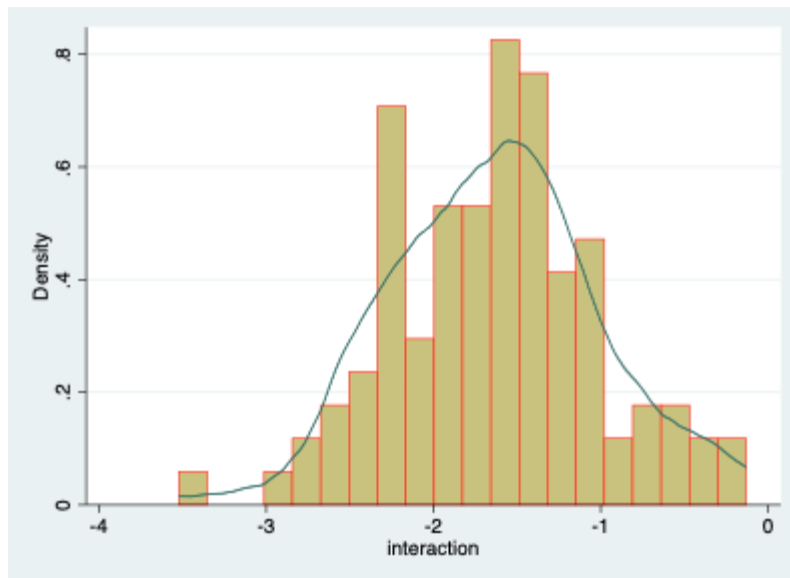
Second, we used the k-fold cross-validation procedure, in which the survey data is randomly divided into k equal sized subsamples (folds). One subsample is used to test the data and the remaining $k-1$ subsamples are used to train the data; this procedure is repeated k times, with each subsample taking a turn as the validation data. With $k(100)$, the number of folds with a statistically significant ($p<0.05$) interaction term was 100 out of 100, which indicates that the estimate is indeed very robust. The average p-value was $p<.008$. A histogram of the distribution of the interaction term coefficients is displayed below (see **Figure A.2**).

**Figure A.2. Histogram of Interaction Term Coefficients**
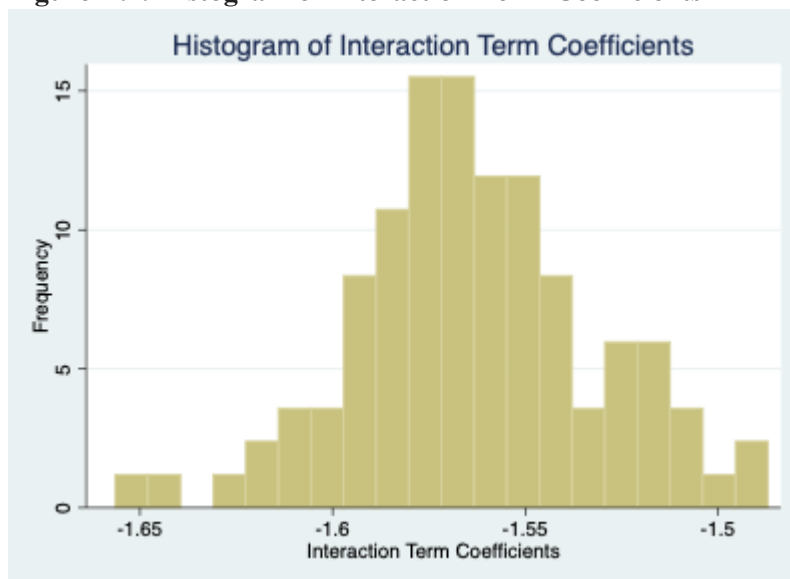
Appendix E

Examining Which Practices Matter Most (Approach with Caution!)

Our composite measure of *practices* includes two categories: those that enhance the probability of detection (company-wide investigations, directed investigations, triaging of complaints, and investigating retaliation) and those that increase the costs of noncompliance (assessment of liquidated damages, assessment of fines and fees, assessment of civil penalties, and securing remedies for retaliation). Although the four measures that comprise each category are distinct, they are sufficiently correlated that the inclusion of each in a single multivariate model introduces multicollinearity, destabilizing the model. We can, however, regress violations on each practice separately in independent models (though please note the word of caution we offer in the text above when interpreting the results).

As **Figure A.3** indicates below, we find that five practices – directed investigations, the assessment of civil penalties, the assessment of fines and fees, remedies for retaliation, and investigations of retaliation – are independently associated with a lower probability of minimum wage violations ($p < 0.05$).

Figure A.3: Independent Relationship Between Each Practice and Probability of Minimum Wage Violation
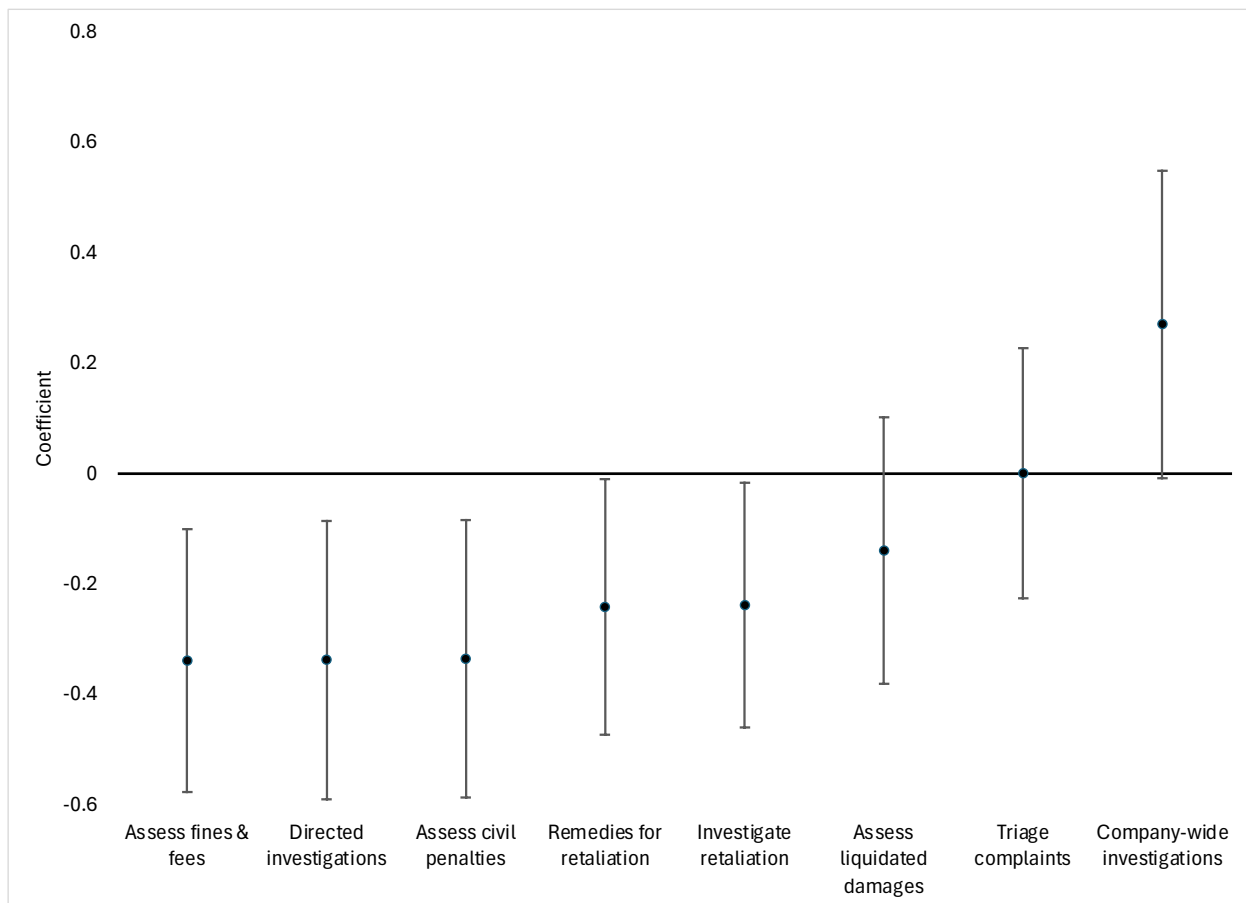
Due to the high correlation between practices within each category, however, it may be more instructive to compare the two composite categories (practices that raise the probability of detection and practices that

increase the costs of noncompliance). This can be accomplished without inviting unacceptable levels of collinearity. **Table A.1** below examines each category separately and together.

Taken by itself, each bundle of practices is statistically significant and in the expected (negative) direction (Models 1 and 2). Considering the relative impact of each, however, reveals that the bundle of practices that increase the costs of noncompliance overpowers those practices that increase the probability of detection; only "costs" remains statistically significant at $p < 0.05$ (Model 3).

Table A.1: Which Practices Matter Most?

	(1)	(2)	(3)
Practices that increase the probability of detection	-0.400** (0.178)		-0.0707 (0.224)
Practices that increase the costs of noncompliance		-0.443*** (0.169)	-0.416** (0.204)
Controls	X	X	X
Constant	-6.254 (6.704)	-0.867 (6.174)	-1.586 (6.034)
Observations	141,692	141,692	141,692

Standard errors clustered by state in parentheses
*** $p < 0.01$, ** $p < 0.05$, * $p < 0.1$