Minimum Wage Violations in New Jersey: Toward Strategic Enforcement

Report by Daniel J. Galvin • Janice Fine • Jenn Round (WJL@RU)

This memo analyzes minimum wage violations in New Jersey, 2009-2019.

- Part I estimates minimum wage violation rates by industry.
- Part II details the occupations of workers paid less than the minimum wage.
- Part III shows regional variation in violation rates (by counties/Region Teams).
- Part IV examines the relationship between *complaints* and *compliance*.
- Part V offers concluding remarks.

Two types of data are used in this report. Underlying violation rates are estimated using Current Population Survey (CPS) Merged Outgoing Rotation Group data. Complaints data are supplied by the New Jersey Department of Labor and Workforce Development – Division of Wage and Hour Compliance (WH).

I. Highest Minimum Wage Violation Rates by Industry (2009-2019)
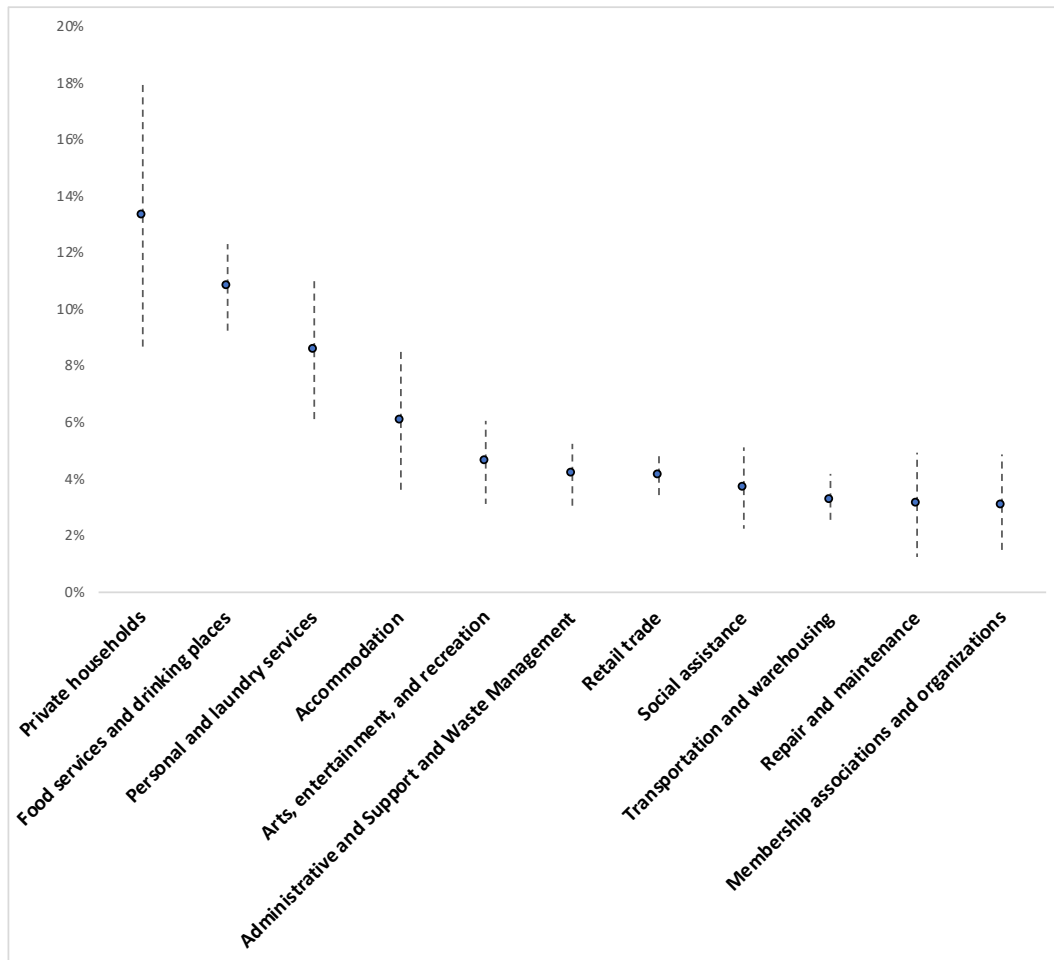
Note: Estimates represent predicted probabilities. 95% confidence intervals shown.

Industry	Violation rate
Private households	13.3%
Food services and drinking places	10.8%
Personal and laundry services	8.6%
Accommodation	6.0%
Arts, entertainment, and recreation	4.6%
Administrative and Support and Waste Management	4.2%
Retail trade	4.1%
Social assistance	3.7%
Transportation and warehousing	3.3%
Repair and maintenance	3.1%
Membership associations and organizations	3.1%

*Average violation rate, all industries, 3.0%.

II. Occupations: Among those paid less than the minimum wage, what jobs were they working (by industry)?

Private households
54%   Maids and housekeeping cleaners
27%   Child care workers

→ this means that out of all the workers in the private household industry who were paid less than the minimum wage, 54% were maids/housekeepers and 27% were child care workers.

Food services and drinking places
38%   Waiters and waitresses
11%   Cooks

Personal and laundry services
39%   Hairdressers, hairstylists, and cosmetologists
17%   Miscellaneous personal appearance workers

Accommodation
18%   Maids and housekeeping cleaners
18%   Recreation and fitness workers
14%   Hosts and hostesses, restaurant, lounge, and coffee shop

Arts, entertainment, and recreation
15%   Recreation and fitness workers
13%   Miscellaneous entertainment attendants and related workers
10%   Lifeguards and other protective service workers
10%   Athletes, coaches, umpires, and related workers

Administrative and Support and Waste Management and Remediation Services
23%   Grounds maintenance workers
18%   Janitors and building cleaners
17%   Maids and housekeeping cleaners

Retail trade
28%   Cashiers
24%   Retail salespersons
10%   Stock clerks and order fillers

Social assistance
42%   Childcare workers
12%   Personal care aides
12%   Preschool and kindergarten teachers

Transportation and warehousing
25%   Taxi drivers and chauffeurs
12%   Laborers and freight, stock, and material movers, hand
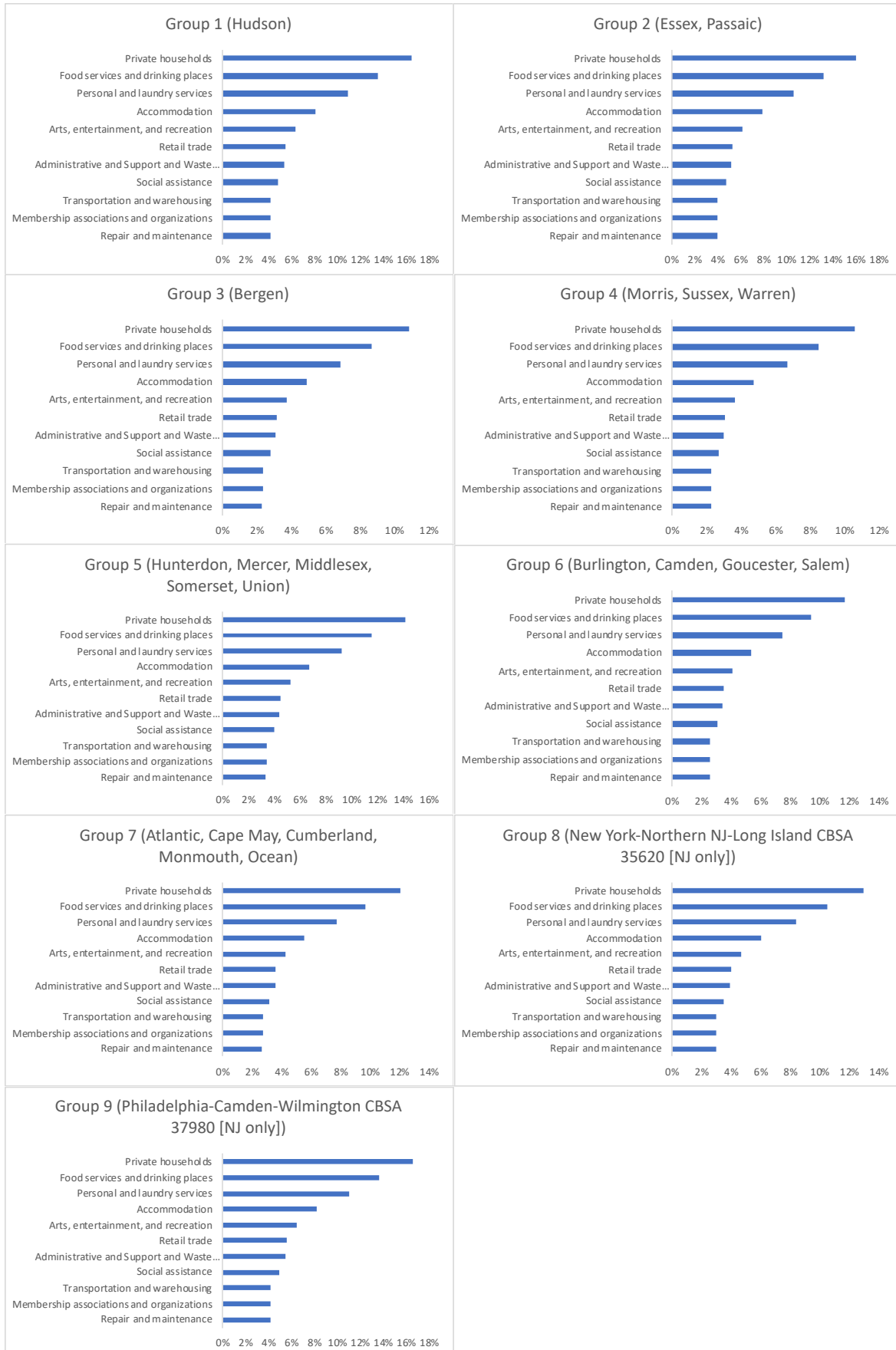11%   Driver/sales workers and truck drivers

III. Variation by Region

Most respondents indicate their county of residence. Some are missing county identifiers but are identified by their metropolitan statistical area. A small number are missing both. We created nine regional groupings of counties and statistical areas that approximate DOL's Region Teams but are of sufficient size to generate meaningful statistical estimates:

Group 1: Hudson (corresponding roughly to DOL Region Team 1A)
Group 2: Essex, Passaic (corresponding roughly to DOL Region Teams 1B, 1I, 1M, & 4I)
Group 3: Bergen (corresponding roughly to DOL Region Team 1C)
Group 4: Morris, Sussex, Warren (corresponding roughly to DOL Region Team 2A)
Group 5: Hunterdon, Mercer, Middlesex, Somerset, Union (2B, 2C, 2I)
Group 6: Burlington, Camden, Gloucester, Salem (3A)
Group 7: Atlantic, Cape May, Cumberland, Monmouth, Ocean (3B, 3C, 3I, 4A)
Group 8: New York-Northern New Jersey-Long Island CBSA 35620 (NJ only)
Group 9: Philadelphia-Camden-Wilmington CBSA 37980 (NJ only)

Remarkably, the rank-order of industry violation rates within each geographic group mirrors the rank-order of industry violation rates across the state *exactly* as in Part I above.
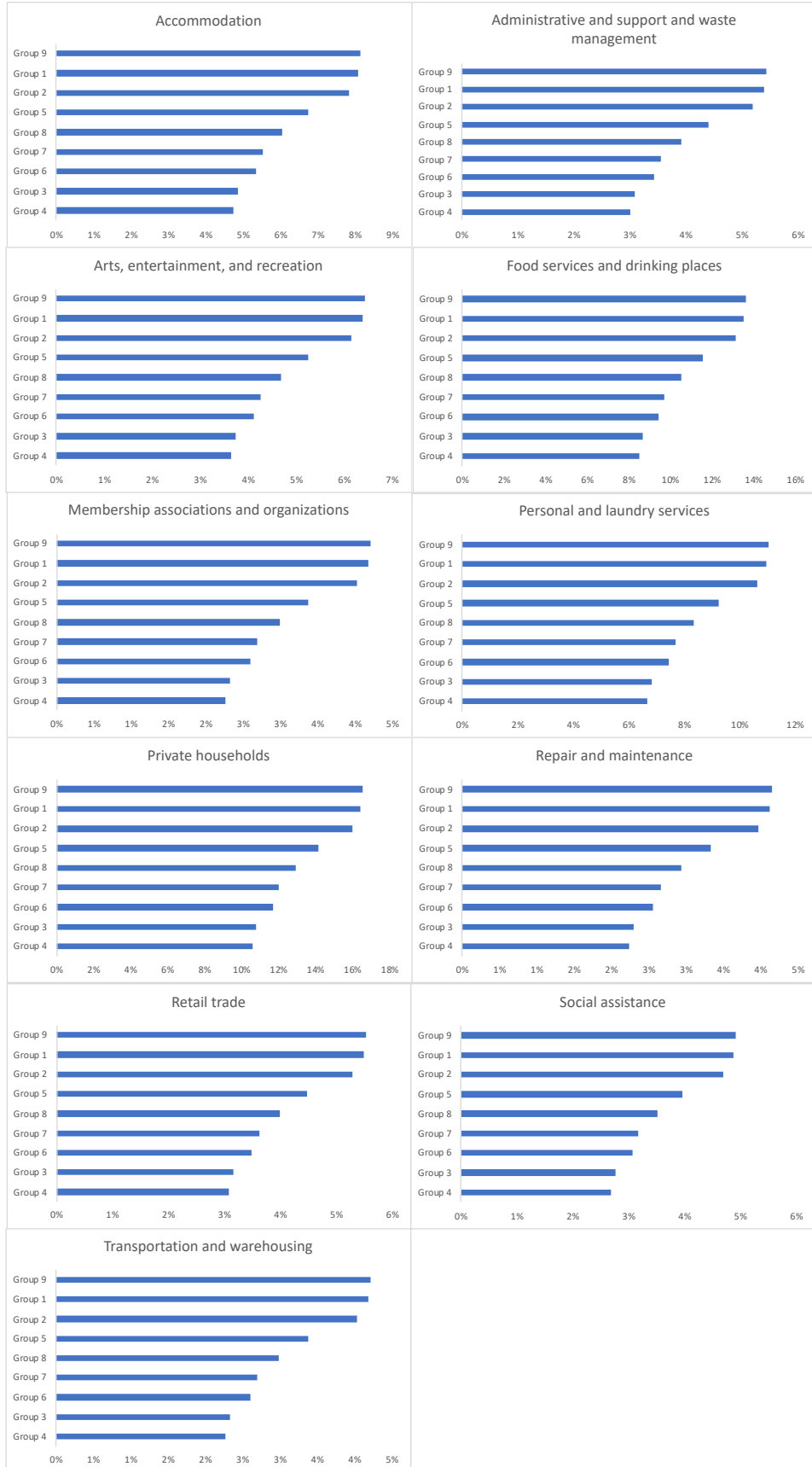
In other words, within each regional group, the private households industry always ranks as the #1 highest-violation industry, followed by the food services and drinking places industry, followed by the personal and laundry services industry, and so on, as in Part I. This stable pattern, broken apart by regional group, is illustrated on the next page:

Group 1 (Hudson)

- Private households
- Food services and drinking places
- Personal and laundry services
- Accommodation
- Arts, entertainment, and recreation
- Retail trade
- Administrative and Support and Waste…
- Social assistance
- Transportation and warehousing
- Membership associations and organizations
- Repair and maintenance

0% 2% 4% 6% 8% 10% 12% 14% 16% 18%

Group 2 (Essex, Passaic)

- Private households
- Food services and drinking places
- Personal and laundry services
- Accommodation
- Arts, entertainment, and recreation
- Retail trade
- Administrative and Support and Waste…
- Social assistance
- Transportation and warehousing
- Membership associations and organizations
- Repair and maintenance

0% 2% 4% 6% 8% 10% 12% 14% 16% 18%

Group 3 (Bergen)

- Private households
- Food services and drinking places
- Personal and laundry services
- Accommodation
- Arts, entertainment, and recreation
- Retail trade
- Administrative and Support and Waste…
- Social assistance
- Transportation and warehousing
- Membership associations and organizations
- Repair and maintenance

0% 2% 4% 6% 8% 10% 12%

Group 4 (Morris, Sussex, Warren)

- Private households
- Food services and drinking places
- Personal and laundry services
- Accommodation
- Arts, entertainment, and recreation
- Retail trade
- Administrative and Support and Waste…
- Social assistance
- Transportation and warehousing
- Membership associations and organizations
- Repair and maintenance

0% 2% 4% 6% 8% 10% 12%

Group 5 (Hunterdon, Mercer, Middlesex, Somerset, Union)

- Private households
- Food services and drinking places
- Personal and laundry services
- Accommodation
- Arts, entertainment, and recreation
- Retail trade
- Administrative and Support and Waste…
- Social assistance
- Transportation and warehousing
- Membership associations and organizations
- Repair and maintenance

0% 2% 4% 6% 8% 10% 12% 14% 16%

Group 6 (Burlington, Camden, Goucester, Salem)

- Private households
- Food services and drinking places
- Personal and laundry services
- Accommodation
- Arts, entertainment, and recreation
- Retail trade
- Administrative and Support and Waste…
- Social assistance
- Transportation and warehousing
- Membership associations and organizations
- Repair and maintenance

0% 2% 4% 6% 8% 10% 12% 14%

Group 7 (Atlantic, Cape May, Cumberland, Monmouth, Ocean)

- Private households
- Food services and drinking places
- Personal and laundry services
- Accommodation
- Arts, entertainment, and recreation
- Retail trade
- Administrative and Support and Waste…
- Social assistance
- Transportation and warehousing
- Membership associations and organizations
- Repair and maintenance

0% 2% 4% 6% 8% 10% 12% 14%

Group 8 (New York-Northern NJ-Long Island CBSA 35620 [NJ only])

- Private households
- Food services and drinking places
- Personal and laundry services
- Accommodation
- Arts, entertainment, and recreation
- Retail trade
- Administrative and Support and Waste…
- Social assistance
- Transportation and warehousing
- Membership associations and organizations
- Repair and maintenance

0% 2% 4% 6% 8% 10% 12% 14%

Group 9 (Philadelphia-Camden-Wilmington CBSA 37980 [NJ only])

- Private households
- Food services and drinking places
- Personal and laundry services
- Accommodation
- Arts, entertainment, and recreation
- Retail trade
- Administrative and Support and Waste…
- Social assistance
- Transportation and warehousing
- Membership associations and organizations
- Repair and maintenance

0% 2% 4% 6% 8% 10% 12% 14% 16% 18%

Equally remarkably, violation rates across geographic regions have a stable rank ordering as well, irrespective of industry. In other words:

- Group 9 has the highest violation rates of any region, irrespective of industry;
- Group 1 has the second-highest violation rates, irrespective of industry;
- Group 2 has the third-highest violation rates, irrespective of industry;
- Group 5 has the fourth-highest violation rates, irrespective of industry;
- Group 8 has the fifth-highest violation rates, irrespective of industry;
- Group 7 has the sixth-highest violation rates, irrespective of industry;
- Group 6 has the seventh-highest violation rates, irrespective of industry;
- Group 3 has the eight-highest violation rates, irrespective of industry;
- Group 4 has the lowest violation rates, irrespective of industry.

These patterns, broken apart by industry, are illustrated on the next page:

Accommodation

Group 9
Group 1
Group 2
Group 5
Group 8
Group 7
Group 6
Group 3
Group 4

0% 1% 2% 3% 4% 5% 6% 7% 8% 9%

Administrative and support and waste management

Group 9
Group 1
Group 2
Group 5
Group 8
Group 7
Group 6
Group 3
Group 4

0% 1% 2% 3% 4% 5% 6%

Arts, entertainment, and recreation

Group 9
Group 1
Group 2
Group 5
Group 8
Group 7
Group 6
Group 3
Group 4

0% 1% 2% 3% 4% 5% 6% 7%

Food services and drinking places

Group 9
Group 1
Group 2
Group 5
Group 8
Group 7
Group 6
Group 3
Group 4

0% 2% 4% 6% 8% 10% 12% 14% 16%

Membership associations and organizations

Group 9
Group 1
Group 2
Group 5
Group 8
Group 7
Group 6
Group 3
Group 4

0% 1% 1% 2% 2% 3% 3% 4% 4% 5%

Personal and laundry services

Group 9
Group 1
Group 2
Group 5
Group 8
Group 7
Group 6
Group 3
Group 4

0% 2% 4% 6% 8% 10% 12%

Private households

Group 9
Group 1
Group 2
Group 5
Group 8
Group 7
Group 6
Group 3
Group 4

0% 2% 4% 6% 8% 10% 12% 14% 16% 18%

Repair and maintenance

Group 9
Group 1
Group 2
Group 5
Group 8
Group 7
Group 6
Group 3
Group 4

0% 1% 1% 2% 2% 3% 3% 4% 4% 5%

Retail trade

Group 9
Group 1
Group 2
Group 5
Group 8
Group 7
Group 6
Group 3
Group 4

0% 1% 2% 3% 4% 5% 6%

Social assistance

Group 9
Group 1
Group 2
Group 5
Group 8
Group 7
Group 6
Group 3
Group 4

0% 1% 2% 3% 4% 5% 6%

Transportation and warehousing

Group 9
Group 1
Group 2
Group 5
Group 8
Group 7
Group 6
Group 3
Group 4

0% 1% 1% 2% 2% 3% 3% 4% 4% 5%

IV. Who Complains and Who Doesn't Complain?

In this section, we examine the relationship between minimum wage complaints received by the New Jersey Department of Labor and Workforce Development – Division of Wage and Hour Compliance (WHD) and our estimates of underlying minimum wage violations using the Current Population Survey (CPS). Complaint rates are standardized (complaints per 10,000 workers by industry).[1]

Regulators typically want to know that the workers who are not being paid what they are legally owed are complaining and that the workers who are complaining are voicing genuine grievances. That is, they wish to minimize both false negatives (violations that go unreported) and false positives (complaints without violations). False negatives are, of course, the most worrisome in complaint-driven regulatory systems, as they likely include the most vulnerable and exploited workers who are fearful of complaining or are unable to complain, and are therefore falling through the cracks. *Quiet* industries should be *compliant* industries, not industries where workers are suffering silently.

We conceptualize the relationship between compliance and complaints as a 2 x 2 matrix:[2]

	High Violations	**Low Violations**
High Complaints	*Quadrant 1* High complaints High violations	*Quadrant 3* High complaints Low violations
Low Complaints	*Quadrant 2* Low complaints High violations	*Quadrant 4* Low complaints Low violations

Ideally, all industries will be located in Quadrants 1 and 4. Workers in industries with high violation rates should have unimpeded access to the complaint process; complaint rates in those industries should reflect underlying violation rates. Likewise, where violation rates are low, complaint rates should be equally low. In those two ideal-type quadrants, the DOL's enforcement resources will be well-applied.

One hopes that no workers will be found in Quadrant 2—high-violation industries that produce relatively few complaints—and that few workers will be found in Quadrant 3—high complaint rates despite low violations. The existence of workers in Quadrants 2 and 3 would indicate "significant problems in terms of enforcement resources reaching the right workplaces."[3]

Using NJ DOL Wage and Hour complaint data in conjunction with the CPS data, we can begin to fill out the 2 x 2 matrix and answer the following questions: "Are industries with

the most frequent and severe violations also those that show the highest frequency of worker complaints? Are there industries that we know to be serious violators that [DOL is] not hearing from? Do investigators spend a disproportionate amount of time on industries that are less egregious violators?"[4]

Industries (and Occupations) Ranking among the Highest and Lowest in Estimated Minimum Wage Violation Rates and Complaint Rates

	High estimated violation rate	Low estimated violation rate
High complaint rate	*Quadrant 1* • **Food services & drinking places** (Waiters, waitresses, cooks) • **Personal and laundry services** (Hairdressers, cosmetologists) • **Textile, apparel, leather manufacturing** (Sewing machine operators)	*Quadrant 3* • **Construction** (Construction laborers; painters, maintenance and paperhangers) • **Transportation equip. manufacturing** (Misc. assemblers & fabricators) • **Primary metals & fabr. metal products** (Shipping, receiving traffic clerks)
Low complaint rate	*Quadrant 2* • **Private households** (Maids, housekeepers, child care workers) • **Accommodation** (Maids, housekeepers; recreation and fitness workers; hosts and hostesses; restaurant, lounge, coffee shop workers) • **Arts, entertainment, recreation** (Recreation and fitness workers; misc. entertainment attendants; lifeguards; athletes, coaches, umpires, and related)	*Quadrant 4* • **Public administration** (Bailiffs, correctional officers) • **Telecommunications** (Sales representatives, services) • **Machinery manufacturing** (Packers and packagers) • **Utilities** (Customer service reps.)

The matrix above shows several industries in New Jersey with high estimated minimum wage violation rates *and* high complaint rates (**Quadrant 1**), including: food services and drinking places; personal and laundry services; and textile, apparel, and leather manufacturing. In those industries, violations are frequent, but workers are complaining at high rates. Numerous industries are also found to have relatively low violation rates and commensurately low complaint rates (**Quadrant 4**), including (but not limited to): public administration; telecommunications; machinery manufacturing; and utilities. **Industries in quadrants 1 and 4 should be considered the most "functional."**[5]

However, the matrix also reveals several industries that are problematic. Industries in **Quadrant 3**—construction, transportation and equipment manufacturing, and primary metals and fabricated metal products—yield many "false positives," meaning that the rate of minimum wage complaints received by the NJ DOL WHD significantly outstrips the estimated rate of violations in those industries. Violations in these industries are relatively rare, but workers in these industries tend to be highly "vocal." This means that NJ DOL-WHD's resources may be inefficiently allocated to investigating complaints in these industries.

More troublingly, industries in **Quadrant 2** are found to have relatively high estimated rates of minimum wage violations but workers in those industries make relatively few complaints to the New Jersey DOL—which is to say, industries in the bottom left-hand quadrant have the most "false negatives." These industries include: private households; accommodation; and arts, entertainment, and recreation. **Industries in quadrants 2 and 3 should be considered the most "dysfunctional."[6]**

Who are the workers in Quadrant 2? In the **private households** industry, the majority of workers paid less than the minimum wage are maids and housekeeping cleaners (54%). The second largest group of wage-theft victims in the private households industry are child care workers (27%). In the **accommodation** industry, violations are spread roughly equally between maids and housekeeping cleaners (18%), recreation and fitness workers (18%), and hosts and hostesses, restaurant, lounge, and coffee shop workers (14%). In the **arts, entertainment, and recreation industry**, minimum wage violations are distributed between workers in the following occupations: recreation and fitness workers (15%), miscellaneous entertainment attendants and related workers (13%), lifeguards and other protective service workers (10%), and athletes, coaches, umpires, and related workers (10%).

These data do not tell us exactly *why* certain industries have higher/lower complaint and violation rates. But note that the industries with the most false negatives (Quadrant 2) tend to employ many women and immigrants, while industries with the most false positives (Quadrant 3) typically employ more men and historically have been more unionized. For example, we estimate that the private households industry in New Jersey was 97% female, 51% noncitizen, 38% Hispanic, and was 0% unionized. The construction industry, in contrast, was 91% male, 68% white, and was 26% unionized. This pattern holds across industries and occupations, as shown in Part V below.

Another way to think about violations in problematic quadrant 2 is to consider the number of minimum wage violations associated with one complaint—or, put differently, "how many violations does it appear to take to trigger one employee complaint?"[7] This alternative way of viewing the relationship between complaints and compliance is useful because of differences across industries in the propensity to complain despite similar underlying conditions. The table below indicates the ratio of total estimated violations for an industry to the total number of complaints filed with the DOL. The lower the ratio, the more "vocal" the workers in the industry, and the more attention received from the DOL. The higher the ratio, the greater the number of unreported/unknown violations. As shown

below, the NJ DOL currently receives only one complaint for every 372 violations in the private households industry.

Number of Minimum Wage Violations Associated with One Complaint Case

Private households	372
Membership associations and organizations	179
Hospitals	121
Educational services	119
Wholesale trade	110
Chemical manufacturing	73
Accommodation	67
Finance and insurance	66
Arts, entertainment, and recreation	57
Health care services, except hospitals	50
Food services and drinking places	43
Utilities	31
Social assistance	30
Retail trade	25
Transportation and warehousing	23
Machinery manufacturing	22
Miscellaneous and not specified manufacturing	19
Textile, apparel, and leather manufacturing	19
Personal and laundry services	18
Computer and electronic products	8
Repair and maintenance	8
Professional and technical services	5
Primary metals and fabricated metal products	5
Food manufacturing	5
Paper and printing	5
Publishing industries (except internet)	4
Construction	2
Transportation equipment manufacturing	2
Administrative and support and waste management	2
Real estate and rental and leasing	0
Telecommunications	0
Public administration	0

Finally, note that high violation and complaint rates in quadrant 1 are not signs of "well functioning" industries. Given the size of these sectors and the high levels of estimated violations, these industries should continue to be a key focus of the NJ DOL's enforcement efforts in addition to the "dysfunctional" quadrant 2 industries mentioned above.

V. Importance of Demographic Factors

We find that workers who were not paid what they were legally owed lost on average $1.62 per hour, or 20% of the legal minimum wage to which they were entitled.

Further, we find that Black and Hispanic workers were almost twice as likely to experience a minimum wage violation as white workers, and noncitizens[8] were twice as likely to be underpaid as U.S. citizens. Women were 1.5 times more likely to earn less than the minimum wage than men.

When the interaction of gender, race, and citizenship are taken into account, the effects of discrimination were compounded. Black women who were not U.S. citizens, for example, were 3.2 times more likely to experience a minimum wage violation than were white women who were citizens. Hispanic women who were not U.S. citizens were 2.6 times more likely to experience a minimum wage violation than were white women who were citizens.

Probability of minimum wage violation relative to reference group, 2009-2019
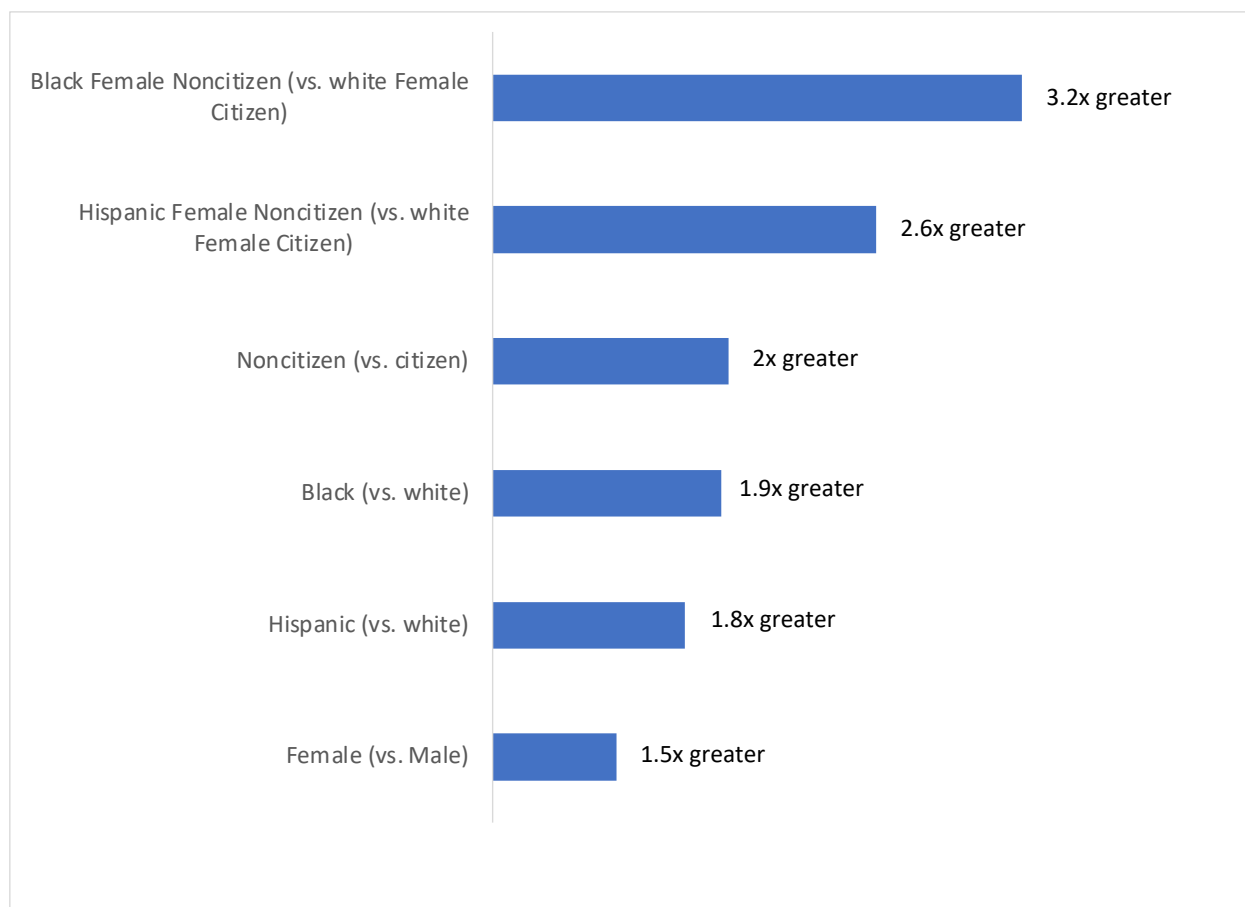
VI. Conclusion

In sum, comparing complaint data from the New Jersey Department of Labor and Workforce Development with minimum wage violation estimates derived from the Current Population Survey data leads to our conclusion that minimum wage violations continue to go unreported across the state of New Jersey. This issue is particularly vital to address in industries such as domestic work, leisure and hospitality, and other low-wage service industries where wage theft is pervasive and complaints are few. The results of this study further suggest that wage theft is experienced disproportionately in certain demographic groups and is compounded when overlapping categories of race, gender, and citizenship are taken into account.

It is our hope that these results may help inform a strategic enforcement program within New Jersey. We believe that investing in a proactive, data-driven enforcement strategy would play a crucial role in effectively and efficiently enforcing the state's minimum wage, and ultimately would save many workers and their families from experiencing the ramifications of wage theft.

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Methodological Appendix

The actual number of minimum wage violations is unknown. Minimum wage violations must therefore be estimated using survey data.

Most useful is the Current Population Survey's 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.[9]

The CPS-MORG data 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. The biggest downside is measurement error, as with any survey.

The methodological approach employed here is consistent with previous research.[10]

A few key points to keep in mind:

Wage variable.
First, for hourly wages, we use CEPR's "wage4" variable, which includes overtime, tips, and commissions (OTC) for both hourly and nonhourly workers.[11] <u>Wage estimates are therefore conservative over-estimates that effectively downward-bias the estimated minimum wage violation rates.</u> This is preferable to the alternative, however, which excludes OTC for hourly workers while including it for nonhourly workers (for whom different sources of wages are not distinguished). Efforts to estimate and subtract OTC from nonhourly workers adds unknown quantities of additional measurement error to this key variable, and is not recommended.[12] We also generated estimates using NBER's favored "wage3" variable, but the estimated violation rates are virtually identical.

Calculating minimum wage violations.
Minimum wage violations are dichotomous measures of whether an individual's estimated hourly wage was lower than the applicable legal minimum. We use New Jersey's applicable statutory minimum wage rate as of the date effective. We are grateful to Ben Zipperer for sharing the latest data from Kavya Vaghul and Ben Zipperer, "Historical state and sub-state minimum wage data," which can be found here:
https://github.com/benzipperer/historicalminwage/releases/tag/v1.2.0. Workers exempt from NJ's minimum wage are excluded where CPS responses permit occupational distinctions (outside salespersons are excluded but the following are not: fulltime students employed by college; motor vehicle salespeople; part-time workers "primarily" engaged in child care (N=4); minors under 18 without special permits; summer employees employed by nonprofits).

Survey weights and standard errors.
All analyses, including population estimates, use survey weights suggested by Davern et. al (2007), which are necessary given the sampling method of the CPS.

Measurement error
There is reason to believe that measurement error in the CPS may downward-bias the estimates of minimum wage violations.[13] First, despite going to great lengths to reach them, both Hispanics (Latinos) and undocumented immigrants are underrepresented in the CPS.[14] Because workers in these groups are at higher risk of experiencing minimum wage violations, the estimates of violations reported here should be considered conservative estimates.[15] Second, in Bollinger's study of measurement error in the CPS, he finds a "high overreporting of income for low-income men" driven by "about 10% of the reporters who grossly overreport their income," thus potentially biasing estimates downward even further.[16] 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.[17] Roemer does find that the CPS reaches more "underground" workers than other large-scale surveys and is less biased than alternatives.[18] 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—much higher than the estimates presented here—there is reason to suspect that these findings underestimate the prevalence of minimum wage violations across the board.[19] These considerations notwithstanding, the fact that measurement error surely exists recommends using caution when working with the point estimates reported.

To correct for measurement error, we also follow ERG (2014), Galvin (2016), and Cooper and Kroeger (2017) and do the following:
- 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
- Violation only if less than applicable minimum wage minus $0.25 (as sensitivity test)

Complaint data
We use complaint data supplied by the New Jersey Department of Labor and Workforce Development – Division of Wage and Hour Compliance (WH). Because there were no geographic identifiers on the complaints, we were not able to conduct an analysis of regional variation in complaints. Industry codes were not consistently entered along with complaints until 2009. We therefore confined our analysis to the 2009-2019 period.

Industry size estimates
We used Quarterly Census of Employment and Wages data supplied by the Bureau of Labor Statistics for employment statistics by industry for all industries except private households

and agriculture (which was excluded due to insufficient sample size [see below]), as these industries are not covered in QCEW data. For those industries, we generate industry size estimates using CPS data.

We excluded industries with fewer 100 observations in the CPS between 2009-2019. These included: electrical equipment, appliance manufacturing; motion picture and sound recording; furniture and fixtures manufacturing; beverage and tobacco products; agriculture; and wood products. Other industries were excluded because there were zero estimated violations: forestry, logging, fishing, hunting, and trapping; mining; petroleum and coal products; plastics and rubber products; broadcasting (except internet); internet publishing and broadcasting; internet service providers and data processing services; management of companies and enterprises; and the armed forces.

Industry NAICS Codes

Industry	NAICS Codes
Private households	814
Food services and drinking places	722
Personal and laundry services	812
Accommodation	721
Arts, entertainment, and recreation	71
Administrative and Support and Waste Management	56
Retail trade	44-45
Social assistance	624
Transportation and warehousing	48-49
Repair and maintenance	811
Membership associations and organizations	813

Geographic Groups
As noted, to create large enough geographic groups for statistical purposes, we combined several counties, making every effort to approximate New Jersey DOL's Region Teams while balancing observations across groups. The N for each group was as follows (note that group zero includes respondents with no geographic identifiers):

Group Number	Sample Size
Group 0 (no geographic identifying information)	338
Group 1 (Hudson)	2,736
Group 2 (Essex, Passaic)	3,525

Group 3 (Bergen)	4,235
Group 4 (Morris, Sussex, Warren)	3,470
Group 5 (Hunterdon, Mercer, Middlesex, Somerset, Union)	6,410
Group 6 (Burlington, Camden, Gloucester, Salem)	4,155
Group 7 (Atlantic, Cape May, Cumberland, Monmouth, Ocean)	4,720
Group 8 (New York-Northern New Jersey-Long Island CBSA 35620 (NJ only)	6,987
Group 9 Philadelphia-Camden-Wilmington CBSA 37980 (NJ only)	1,170
Total	**37,746**

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[1] Some industries employ many more workers than others. To compare the number of complaints received across industries of very different sizes, we standardize rates (following Weil and Pyles (2005)). For example, the NJ DOL received 289 complaints from workers in the Professional and Technical Services industry; while that seems like a large number of complaints relative to other industries (the agency received only 8 complaints from workers in the Chemical Manufacturing industry), the former is a very large industry, with approximately 250,000 employees in New Jersey, while the latter is a much smaller industry, employing only about 48,000 workers. We therefore calculate "complaint rates," which are comparable across industries (calculated as the number of complaints per 10,000 workers). In this example here, the former's complaint rate was 10, while the latter's was 2—both were below average (16).

[2] Here, we follow David Weil and Amanda Pyles in their classic 2005 article "Why Complain?: Complaints, Compliance, and the Problem of Enforcement in the Us Workplace." *Comp. Lab. L. & Pol'y. J.* 27:59.

[3] Ibid.

[4] Ibid.

[5] Ibid.

[6] Ibid.

[7] Ibid.

[8] Note that according to the CPS, noncitizen refers to any person born outside the U.S. who is not a naturalized U.S. citizen (e.g., refugee, asylee, undocumented immigrant legal permanent resident), not born in Puerto Rico, and does not have parents who are U.S. citizens.

[9] Ashenfelter and Smith 1979; Ehrenberg and Schumann 1982; Sellekaerts and Welch 1984; Trejo 1991, 1993; Fry and Lowell 1997; Weil and Pyles 2005; U.S. Department of Labor 2014; ERG 2014; Galvin 2016; Cooper and Kroeger 2017.

[10] In particular, Galvin 2016; U.S. Department of Labor 2014; Cooper and Kroeger 2017.

[11] http://ceprdata.org/cps-uniform-data-extracts/cps-outgoing-rotation-group/.

See also Cooper and Kroeger's 2017 preference for this method of estimating wages.

[12] U.S. Department of Labor 2014.

[13] For an excellent discussion of the advantages and limitations of using the CPS data to estimate minimum wage violations given the existence of measurement error and other issues, see U.S. Department of Labor 2014, Appendix B.

[14] McKay 1992. As Bernhardt et al. 2009 write: "standard surveying techniques—phone interviews or census-style door-to-door interviews—rarely are able to fully capture the population that we are most interested in: low- wage workers who may be hard to identify from official databases, who may be vulnerable because of their immigration status, or who are reluctant to take part in a survey because they fear retaliation from their employers. Trust is also an issue when asking for the details about a worker's job, the wages they receive, whether they are paid off the books or not, and their personal background" (56).

[15] McKay 1992; Bernhardt et al. 2009; U.S. Department of Labor 2014.

[16] Bollinger 1998.

[17] Roemer 2002; U.S. Department of Labor 2014.

[18] Roemer 2002.

[19] Bernhardt et al. 2009.