



Informing Strategic Enforcement Practices

Claims and Compliance with Oregon's Minimum Wage

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Introduction

The state of Oregon has been a national leader in providing progressive labor standards to its constituents for over a century. Enacting one of the nation's first minimum wage laws in 1913, Oregon's wage has for decades been amongst the highest in the nation. Most recently, Oregon lawmakers passed SB 1532 in 2016, creating three separate state minimum wage schedules that raise the wage to \$12.50 (in "nonurban" counties), \$13.50 (in "standard" counties), and \$14.75 (in the Portland metro area) by 2022 and indexed to inflation thereafter.

The Oregon Bureau of Labor & Industries (BOLI) has been engaging with the Workplace Justice Lab @ Rutgers University (WJL@RU) since 2020 in an effort to optimize resources and maximize the impact of its enforcement efforts. Understanding that studies in other jurisdictions have demonstrated a mismatch between a) industries with the highest complaint rates and b) industries with the highest underlying rates of labor standards violations, BOLI worked with WJL@RU to determine the degree to which wage claims submitted to BOLI align with estimates of minimum wage violations in Oregon.

This report uses data from the Current Population Survey's Merged Outgoing Rotation Groups (CPS-MORG) to estimate the incidence and impact of minimum wage violations across the state of Oregon from 2010 to 2020.¹ These violation estimates are then compared to claims submitted to BOLI over the same period to begin to unpack how claims may differ from underlying violations.²

We find that significant numbers of violations of Oregon's minimum wage ordinance are in fact going unreported. Oregonians on average lose \$283 million to \$405 million a year from being paid below the mandated minimum wage. While we estimate that an average of 88,000 to 128,000 workers a year are paid below the minimum wage in Oregon, BOLI received an average of just 443 minimum wage and/or overtime claims per year during the study period.

¹ It is important to note that these estimates are for the entirety of Oregon. While it is technically possible to derive estimates by individual county and thus account for the three state minimum wage schedules, the lack of data at the county-level renders these estimates inaccurate and ultimately useless. In order to provide the most meaningful information possible using available resources, we have chosen to calculate minimum wage violation estimates using an "upper/lower bound" method, using the lowest applicable minimum wage within certain areas of the state—i.e., the "nonurban counties" rate—and the highest applicable minimum wage, i.e., the Portland metro rate. By deriving both estimates, we can create a potential range of estimated violations for each industry group for which we may be confident the true number of violations falls somewhere within. We believe this method still reveals important variance in estimated violation rates across industries that may begin to inform proactive enforcement strategies and investigatory efforts. See Appendix II for more on how we derived these estimates.

² A total of 5,511 wage claims were in the received dataset. Because minimum wage claims in many cases cannot be disaggregated from accompanying overtime claims, all claims in which a minimum wage and/or overtime violation were alleged are included in the analysis. After removing 635 claims with a status of "pending" or "no response" that could not be confirmed as pertaining to MW/OT violations, 4,876 claims from January 2010 to December 2020 were included in the above analysis.

Several industries with the highest estimated violation rates have among the lowest complaint rates according to BOLI data (see Appendix I for more on our analytical approach and Appendix II for more on the CPS-MORG data from which minimum wage violation estimates are derived). We hope that these findings serve as a helpful guide for BOLI as it seeks to optimize resources and maximize impact.

Violations by Year

Chart 1. Estimated Minimum Wage Violation Rates and BOLI MW/OT Claims by Year , Oregon, 2010-2020

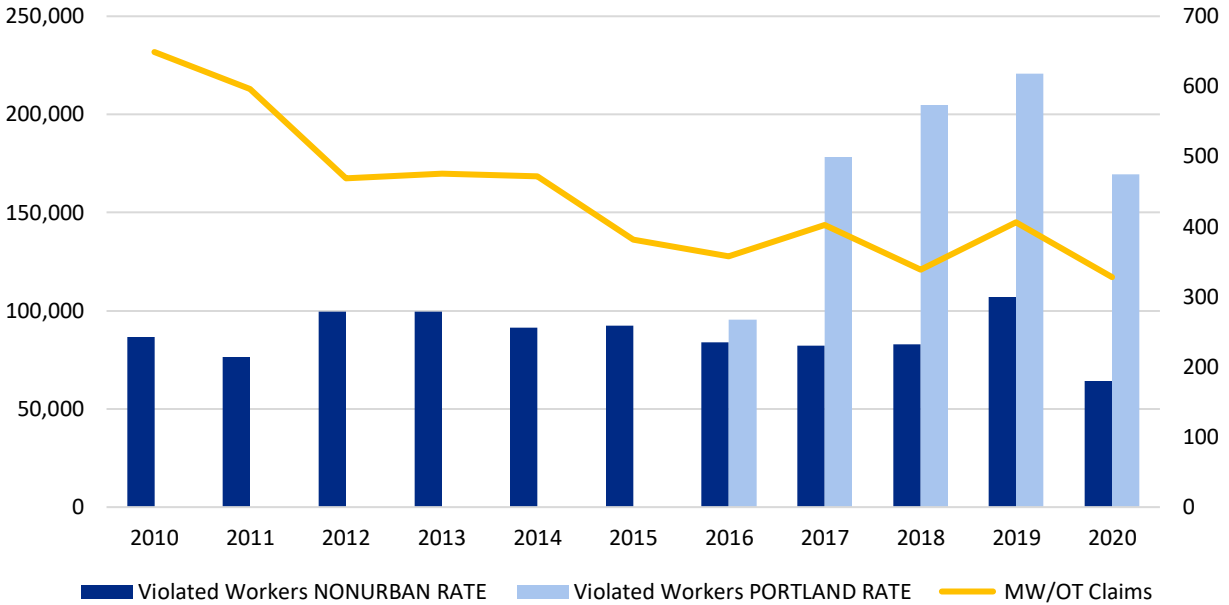


Table 1. Estimated Minimum Wage Violations by Year, Oregon, 2010-2020

| Year | Wage Theft Rate | | Total Violated Workers | | Average Wages Lost | | Total Annual Wages Lost | | MW/OT Claims |
|------|------------------|------------------|------------------------|------------------|--------------------|------------------|-------------------------|------------------|--------------|
| | Nonurban MW Rate | Portland MW Rate | Nonurban MW Rate | Portland MW Rate | Nonurban MW Rate | Portland MW Rate | Nonurban MW Rate | Portland MW Rate | |
| 2010 | 5.9% | | 86,697 | | \$2,682 | | \$232,522,671 | | 649 |
| 2011 | 5.0% | | 76,398 | | \$4,530 | | \$346,080,902 | | 596 |
| 2012 | 6.7% | | 99,447 | | \$2,426 | | \$241,259,303 | | 469 |
| 2013 | 6.8% | | 99,429 | | \$2,746 | | \$273,031,814 | | 476 |
| 2014 | 6.1% | | 91,278 | | \$2,792 | | \$254,847,213 | | 472 |
| 2015 | 6.0% | | 92,333 | | \$2,049 | | \$189,191,014 | | 381 |
| 2016 | 5.1% | 5.8% | 83,820 | 95,324 | \$3,047 | \$2,973 | \$255,398,699 | \$283,399,417 | 358 |
| 2017 | 4.8% | 10.4% | 82,306 | 178,330 | \$3,590 | \$2,946 | \$295,478,655 | \$525,359,402 | 402 |
| 2018 | 4.9% | 12.1% | 82,968 | 204,881 | \$3,902 | \$3,241 | \$323,742,572 | \$664,019,554 | 339 |
| 2019 | 6.2% | 12.8% | 106,875 | 220,645 | \$4,393 | \$4,093 | \$469,501,242 | \$903,099,428 | 406 |
| 2020 | 3.9% | 10.3% | 64,177 | 169,492 | \$3,656 | \$3,223 | \$234,629,814 | \$546,273,248 | 328 |

Minimum wage violation estimates by year are shown in **Chart 1** and **Table 1** above. We estimate that 88,000 to 128,000 Oregonians a year were paid below the minimum wage in the eleven-year period between 2010 and 2020. These workers on average lost roughly \$3,000 a year, totaling an average of \$283 million to \$405 million in lost wages a year across the state during the entire study period. Until SB 1532 went into effect, a single minimum wage rate covered the entire state; we estimate that Oregonians lost an average of \$256 million a year from being paid below the minimum wage during these years (i.e., 2010-2015). As previously mentioned and discussed further in Appendix II, given limitations of the CPS data, we are unable to create a single estimate of violations that accurately accounts for the three minimum wage rates established by SB 1532 in the particular areas to which they apply. We therefore create two sets of statewide estimates using the highest and lowest applicable rates from 2016 to 2020. When using the nonurban rate for the entirety of the state—i.e., the “lower bound” in the current study—we estimate that workers lost an average of nearly \$316 million a year during these years. When instead using the Portland rate for the entirety of the state—i.e., the “upper bound”—workers are estimated to have lost over \$584 million a year during this same five-year period. As the upper bound calculation surely includes many “false positives” and the lower bound includes “false negatives,”³ we can be confident that the true estimate lies somewhere between these two values.

The estimated number of workers experiencing wage theft rose from roughly 76,000 in 2011 to just under 100,000 in 2012. The number of workers being paid beneath the state’s minimum wage rate remained relatively constant from 2012 to 2015. When using the nonurban minimum wage rate after SB 1532 went into effect, the estimated number of impacted workers goes down slightly from past years before jumping to over 106,000 workers in 2019. When instead using the Portland minimum wage rate after it went into effect in 2016—the “upper bound”—the number of workers estimated to be paid below the minimum wage in 2019 jumps to over 220,000. The number of workers experiencing minimum wage violations appears to have fallen dramatically in 2020 regardless of which rate is used in the calculation; we believe this is most likely due to some combination of a) many low-wage workers losing their jobs during the first months of the COVID pandemic and b) essential workers who were still employed being more highly valued by their employers, although the true impact of these factors is unknown.

The number of MW/OT claims received by BOLI has also gone down in recent years. In the six-year period between 2010 and 2015 before SB 1532 was passed, BOLI received on average 507 MW/OT claims a year. Rather than going up after SB 1532 went into effect, the number of claims declined to an average of 367 MW/OT claims per year between 2016 and 2020 as the minimum wage rate continued to increase at unprecedented levels. Although this in theory could be due to fewer employer violations, our findings on the underlying rates of minimum wage theft in recent years makes clear that this is not the case. While we

³ “False positives” in this case mean workers in nonurban areas being marked as experiencing a minimum wage violation for being paid below the Portland rate, even if they were appropriately paid the nonurban rate; “false negatives” on the other hand mean workers in Portland being marked as *not* experiencing a minimum wage violation as they were paid above the nonurban rate but below the Portland rate.

estimate that an average of 88,000 to 128,000 workers a year are paid below the minimum wage in Oregon, BOLI received an average of just 443 minimum wage and/or overtime claims per year during the study period.

Violation Rates by Industry

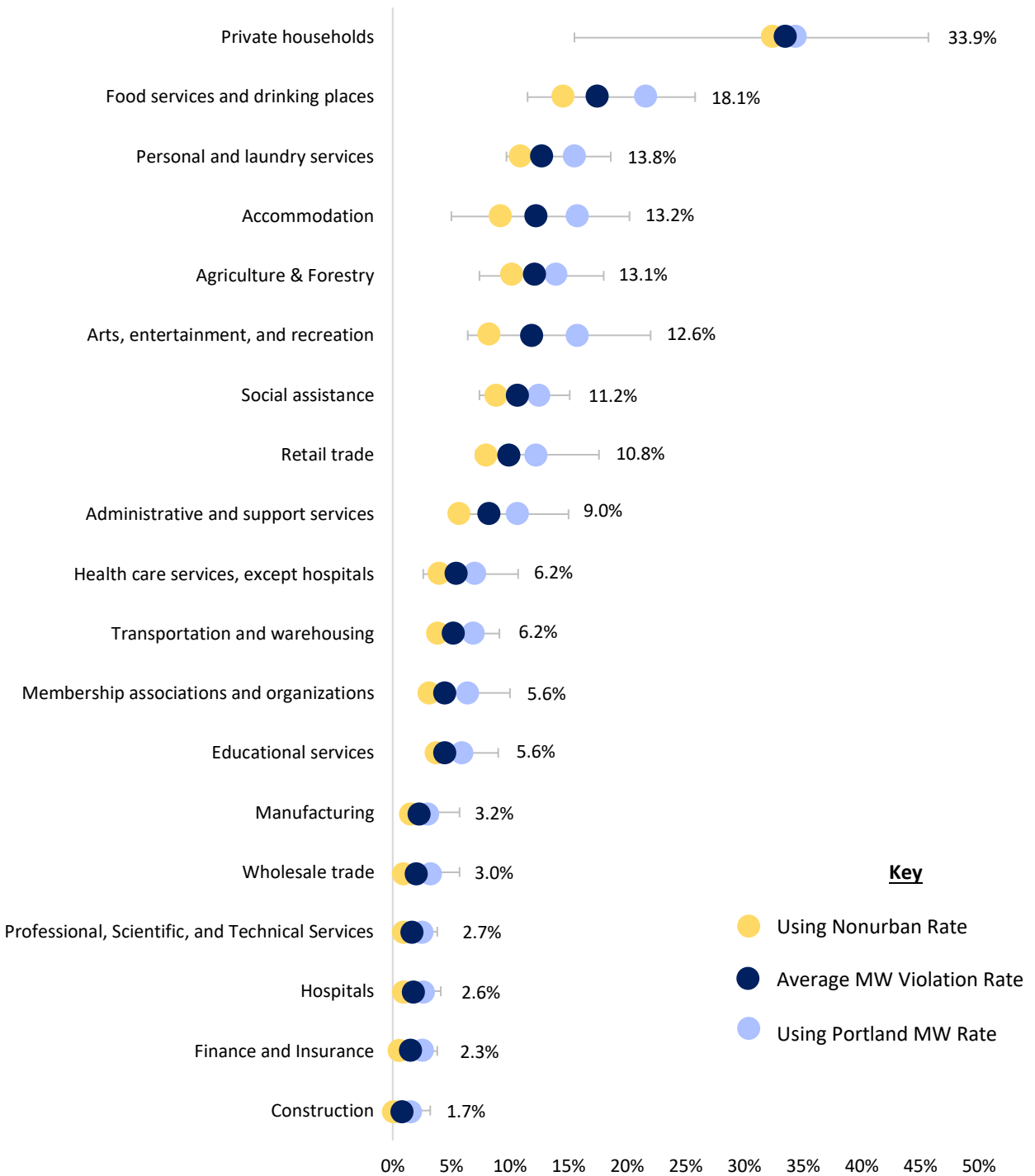
Chart 2 below shows estimated minimum wage violation rates for each industry group for which estimates could be derived (we report the average of the two estimates—see Appendix III for full estimates). Industries with the highest violation rates include private households (33.9%); food services and drinking places (18.1%); personal and laundry services (13.8%) accommodation (13.2%); and agriculture (13.1%).

To put these numbers into perspective, we estimate that over one in three Oregonians employed in private households—i.e., domestic workers—have experienced a minimum wage violation. Likewise, roughly one in every six workers in food services (e.g., fast food workers, cooks, dishwashers, bartenders, waiters and waitresses) and one in seven-to-eight workers in personal and laundry services (e.g., beauticians, massage therapists, animal caretakers), accommodation (e.g., housekeepers, clerks, wait staff) and agriculture (e.g., farmworkers and laborers) have faced a minimum wage violation. While these industries have a history of exemption from labor standards after being partially or completely left out of major New Deal labor and employment legislation,⁴ these workers today are largely covered under the state’s minimum wage laws. It should further be noted that, based on BOLI claim data, many of the employers with the most claims filed against them come from these industries. Of the 35 employers that had ten or more wage claims filed against them, more than half worked in food services (14) or agriculture (6).

Those with the lowest estimated violation rates include construction (1.7%); finance and insurance (2.3%); hospitals (2.6%); and professional, scientific and technical services (2.7%).

⁴ See Sean Farhang and Ira Katznelson, “The Southern Imposition: Congress and Labor in the New Deal and Fair Deal,” *Studies in American Political Development* 19, no. 1 (2005): 1-30.

Chart 2. Estimated Minimum Wage Violation Rates by Industry, Oregon, 2010-2020



Note: The dotted lines represent the upper and lower bounds of the 95 percent confidence intervals for each point estimate (for more on CPS methodology, see Appendix III).

Complaint Rates by Industry

Table 2. Highest Complaint and Violation Rates by Industry, Oregon, 2010-2020

| Highest Complaint Rates | | Highest Violation Rates | |
|-------------------------------------|---------------------------|-------------------------------------|---|
| Industry | Claims per 10,000 workers | Industry | Estimated violations per 10,000 workers |
| Repair and maintenance | 95 | Private households | 3390 |
| Food services and drinking places | 92 | Food services and drinking places | 1810 |
| Personal and laundry services | 89 | Personal and laundry services | 1380 |
| Construction | 76 | Accommodation | 1320 |
| Agriculture | 59 | Agriculture | 1310 |
| Utilities | 50 | Arts, entertainment, and recreation | 1260 |
| Transportation and warehousing | 49 | Social assistance | 1120 |
| Accommodation | 43 | Retail trade | 1080 |
| Administrative and support services | 39 | Administrative and support services | 900 |

Table 3. Lowest Complaint and Violation Rates by Industry, Oregon, 2010-2020

| Lowest Complaint Rates | | Lowest Violation Rates | |
|--|---------------------------|---|---|
| Industry | Claims per 10,000 workers | Industry | Estimated violations per 10,000 workers |
| Hospitals | 1 | Construction | 170 |
| Educational services | 3 | Finance and insurance | 230 |
| Wholesale trade | 6 | Hospitals | 260 |
| Finance and insurance | 8 | Professional, scientific and technical services | 270 |
| Social assistance | 9 | Wholesale trade | 300 |
| Manufacturing | 11 | Manufacturing | 320 |
| Membership associations and organizations | 11 | Educational services | 560 |
| Professional, scientific, and technical services | 12 | Membership associations and organizations | 560 |
| Private households | 17 | Transportation and warehousing | 620 |
| Retail trade | 20 | Health care services, except hospitals | 620 |

The tables on page 7 compare the minimum wage violation estimates presented in Chart 2 above with relative wage claims to BOLI (i.e., claims per 10,000 industry workers in Oregon).⁵ **Table 2** compares industries with the *highest* levels of complaints to those with the highest estimated violation rates (see Appendix IV for more information on complaints by industry). Industries with the highest levels of relative complaints include repair and maintenance (95/10,000 workers); food services and drinking places (92); personal and laundry services (89); construction (76); and agriculture (59).

Table 3 meanwhile compares industries with the *lowest* levels of complaints to those with the lowest estimated violation rates. Five industries had relative rates of under 10 complaints per 10,000 workers: hospitals (1); educational services (3); wholesale trade (6); finance and insurance (8); and social assistance (9).

Comparing Violation and Complaint rates

Using the above violation estimates and complaint data, we can begin to fill in the 2 x 2 matrix in **Figure 1** below (see Appendix I for more on our analytical approach).

Figure 1. Complaint/Violation Matrix, Oregon

| | High violation rate | Low violation rate |
|---------------------|--|--|
| High complaint rate | <p>Quadrant 1</p> <ul style="list-style-type: none"> • Food services and drinking places • Agriculture • Personal and laundry services | <p>Quadrant 3</p> <ul style="list-style-type: none"> • Construction • Transportation and warehousing |
| Low complaint rate | <p>Quadrant 2</p> <ul style="list-style-type: none"> • Private households • Social assistance • Retail trade | <p>Quadrant 4</p> <ul style="list-style-type: none"> • Manufacturing • Hospitals • Wholesale trade • Professional, scientific and technical services • Finance and insurance |

⁵ Complaints per 10,000 workers is calculated by, for each industry: (1) dividing total industry complaints to BOLI by average annual industry employment (QCEW) for the study period; and (3) multiplying the calculated complaint rate by 10,000.

The most “dysfunctional” industries are listed in quadrant 2; these are the industries that, while having relatively high estimated levels of minimum wage violations, have registered a low number of complaints to BOLI. These industries include private households; social assistance; and retail trade. The estimates presented here suggest that BOLI currently receives one complaint for roughly every 200 violations occurring in private households; 124 violations in the social assistance industry; and 54 violations happening in retail trade within Oregon. While we estimate that over one in three domestic workers employed in Oregon have faced minimum wage violations—meaning around 3,400 domestic workers facing violations—BOLI received a total of only 16 complaints from these workers.

Social assistance should also be highlighted in this sense. This industry notably includes a number of personal and home care aids—one of the fastest growing occupations in recent years—and child care services, both of which are often cited as having high rates of wage theft. Estimates derived from the CPS-MORG data suggest that roughly 27 percent of Oregonian child care workers⁶ and 17 percent of personal and home care aides have experienced minimum wage theft. Likewise, 14 percent of Oregonian retail salespersons and 22 percent of cashiers—two of the most common occupations in retail trade—have faced a minimum wage violation.

Also important to note are the industries that have high estimated wage violation rates and relatively high levels of complaints (i.e., quadrant 1). These industries include food services and drinking places, agriculture, and personal and laundry services. Although a third of total claims submitted to BOLI from 2010-20 came from these industries, these data suggest that tens of thousands of violations across these industries are still unaccounted for. Given the size of these sectors as noted above—particularly food and drink—and the high levels of estimated violations, it is important that these workers continue to be a key focus of BOLI’s enforcement efforts in addition to the “dysfunctional” industries mentioned above.

Importance of Demographic Factors

These data do not tell us exactly *why* some industries have more or fewer complaints and violations. Still, it is worth noting that the industries with the highest estimated violation rates and relatively low complaints tend to employ many women, people of color, and immigrant workers, while industries with lower violation rates often employ more men and/or historically have been more unionized.

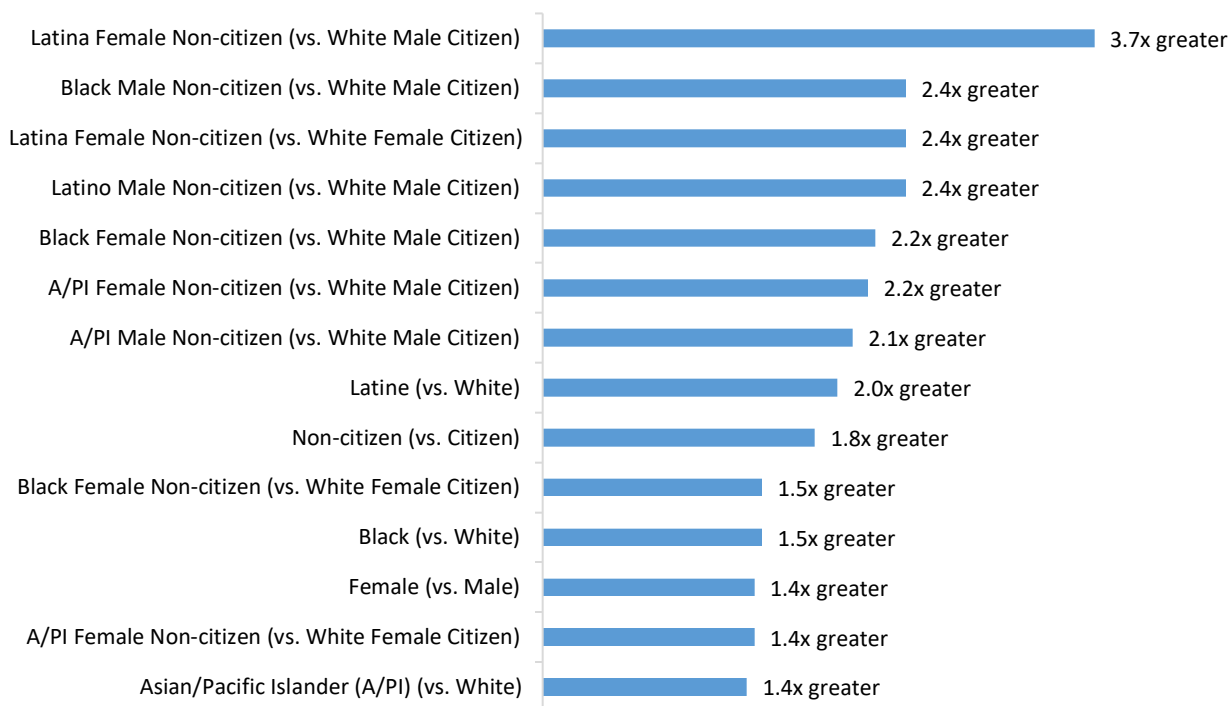
Chart 3 below shows the relative probabilities of demographic groups facing minimum wage violations based on analysis of the CPS-MORG data.⁷ As shown, female, Black and Asian/Pacific Islander (A/PI) workers in Oregon are roughly 40 to 50 percent more likely to

⁶ This does not include nannies—or child care workers employed by private households—as these workers are often exempt from Oregon minimum wage laws.

⁷ These probabilities reflect the average of estimated probabilities based on both the nonurban counties and Portland metro minimum wage rates, consistent with the reported minimum wage violation estimates in Chart 1.

face a minimum wage violation than male or white workers. Non-citizens are 80 percent more likely than citizens to be paid under the minimum wage, while Latine workers are twice as likely than white workers to be paid below the minimum. The categories at the top of Chart 3 show the importance of intersectionality to the experience of wage theft. Compared to White male citizens, A/PI, Black and Latine non-citizens are more than twice as likely to be paid below the minimum wage, regardless of gender. Latina non-citizens are nearly four times as likely to experience a minimum wage violation than white male citizens.

Chart 3. Probability of Minimum Wage Violation by Demographic Group in Oregon (Relative to Reference Group), 2010-2020



Conclusion

In sum, comparing BOLI wage claim data with minimum wage violation estimates derived from the CPS-MORG data leads to our conclusion that minimum wage violations continue to go under-reported across the state of Oregon. This issue is particularly vital to address in industries such as domestic work, social assistance, retail trade, and other low-wage service industries where wage theft is pervasive and complaints are few. BOLI has already taken important steps to address the gap between violations and complaints by launching its [strategic enforcement and outreach units](#) in 2022. We encourage BOLI to continue this endeavor and to regularly use available data to evaluate and revise the initiative as necessary.

About the Authors

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About WJL@RU

The workplace justice lab@RU exists to address economic inequality through supporting and strengthening grassroots organizing and democratic governance. We do this through building dynamic communities of learning and practice, carrying out cutting edge research, and offering specialized training and in-depth one-on-one consultations.

At the lab, we go beyond talking about what government should do, to focusing on how government should do it. Through our strengthening labor standards enforcement program, we work to reimagine the public enforcement of workers' rights laws. By proactively targeting the sectors with the worst problems and involving those directly impacted in enforcement, we help agencies realize the intended impact of innovative labor standards legislation.

Appendices

Appendix I. Analytical approach

We replicate the analytic approach used by former Department of Labor (DOL) Wage and Hour Division Administrator David Weil and Amanda Pyles in their 2005 article “Why Complain?”.⁸ As they explain, regulators typically want to know that the workers who complain are voicing genuine grievances and that the workers who are not being paid what they are legally owed are complaining. That is, regulators wish to minimize both false positives (complaints without violations) and false negatives (violations that go unreported). 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.

Following Weil and Pyles (2005), we conceptualize the relationship between compliance and complaints as a 2 x 2 matrix (Figure 1).

Figure 1. Complaint/Compliance Matrix

| | High noncompliance | Low noncompliance |
|----------------------------|---|--|
| High complaint rate | <i>Quadrant 1</i> High complaints High violations | <i>Quadrant 3</i> High complaints Low violations |
| Low complaint rate | <i>Quadrant 2</i> Low complaints High violations | <i>Quadrant 4</i> Low complaints Low violations |

Ideally, all workers will be found in quadrants 1 and 4. Those working in industries with high violation rates should have unimpeded access to the complaint process, and complaint rates should be commensurate with violation rates. Likewise, in industries with low violation rates, complaint rates should be equally low. In those two ideal-type quadrants, OLSE’s enforcement resources will be well-applied.

⁸ David Weil and Amanda Pyles, “Why Complain?: Complaints, Compliance, and the Problem of Enforcement in the Us Workplace,” *Comp. Lab. L. & Pol’y. J.* 27 (2005).

Ideally, no workers will be found in quadrant 2—low-complaint industries that are rife with violations—and few workers will be found in quadrant 3—high complaints 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” (Weil and Pyles 2005, 72).

Using the BOLI complaint data in conjunction with estimates generated using CPS-MORG 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 [BOLI is] not hearing from? Do investigators spend a disproportionate amount of time on industries that are less egregious violators?” (Weil and Pyles 2005, 71).

Appendix II. CPS data

The actual number of minimum wage violations is unknown. Employer-provided data is not reliable, and state agency data on complaint- and agency-initiated investigations are not necessarily representative of the actual violation rate. 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 WHD 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.

It is important to note that these estimates are for the entirety of Oregon. While it is technically possible to derive estimates by individual county and thus account for the three state minimum wage schedules, the lack of data at the county-level renders these estimates inaccurate and ultimately useless. In order to provide the most meaningful information possible using available resources, we have chosen to calculate minimum wage violation estimates using an "upper/lower bound" method, using the lowest applicable minimum wage within certain areas of the state—i.e., the "nonurban counties" rate—and the highest applicable minimum wage, i.e., the Portland metro rate. By deriving both estimates, we can create a potential range of estimated violations for each industry group for which we may be confident the true number of violations falls somewhere within. We believe this method still reveals important variance in estimated violation rates across industries that may begin to inform proactive enforcement strategies and investigatory efforts. The point estimates reported throughout the study are averages of these two estimates.

⁹ Orley Ashenfelter and Robert S. Smith, "Compliance with the Minimum Wage Law," *Journal of Political Economy* 87, no. 2 (1979); Ronald G. Ehrenberg and Paul L. Schumann, "Compliance with the overtime pay provisions of the Fair Labor Standards Act," *The Journal of Law and Economics* 25, no. 1 (1982); Brigitte Sellekaerts and Stephen W. Welch, "Noncompliance with the Fair Labor Standards Act: Evidence and Policy Implications," *Labor Studies Journal* 8 (1984); Stephen Trejo, "The effects of overtime pay regulation on worker compensation," *American Economic Review* 81, no. 4 (1991); Stephen Trejo, "Overtime pay, overtime hours, and labor unions," *Journal of Labor Economics* 11, no. 2 (1993); Weil and Pyles 2005; Eastern Research Group, *The Social and Economic Effects of Wage Violations: Estimates for California and New York*, Prepared for the U.S. Department of Labor (Lexington: Eastern Research Group, 2014); Daniel J. Galvin, "Deterring Wage Theft: Alt-Labor, State Politics, and the Policy Determinants of Minimum Wage Compliance," *Perspectives on Politics* 14, no. 2 (2016); David Cooper and Teresa Kroeger, "Employers steal billions from workers' paychecks each year," *Economic Policy Institute*, May 10, 2017, <https://www.epi.org/publication/employers-steal-billions-from-workers-paychecks-each-year/>.

The methodological approach we have employed here is fully consistent with previous research.¹⁰ A few key methodological points to keep in mind:

First, we calculate hourly wages using the National Bureau of Economic Research (NBER)'s "earnwke" variable, which includes overtime, tips, and commissions (OTC) for both hourly and nonhourly workers.¹¹ Wage estimates are therefore conservative over-estimates that effectively downward-bias the estimated minimum wage violation rates. 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

A minimum wage violation is defined here as a case in which the calculated hourly wage was lower than the applicable minimum wage. As discussed above, we obtained two sets of estimates using the Oregon minimum wage schedules for (a) the Portland metro area and (b) "nonurban" counties. These estimates amount to an upper and lower bound, respectively, of the range within which true levels of minimum wage violations for each industry lie.

CPS-MORG data from the years 2010 through 2020 were used to develop the minimum wage violation estimates. Data was limited to respondents who were currently employed at the time of the survey. Several classes of workers that are exempt from the Oregon minimum wage were removed from the data, including federal government workers; outside salespersons; taxicab drivers; and nannies (i.e., child care workers working in private households). Some exemptions were unable to be accounted for given the structure of the data, including some agricultural workers;¹³ "casual" (i.e., "irregular and intermittent")¹⁴ domestic work; salaried professionals; camp counselors; golf caddies; and ski patrollers. Given that these exemptions apply to a very limited number of workers, we do not expect their inclusion to significantly impact relative violation rates.

To correct for measurement error, we follow ERG (2014), Galvin (2016), and Cooper and Kroeger (2017) and exclude all observations of workers not specifying hourly/nonhourly status or usual hours worked, observations of nonhourly workers with weekly earnings less than \$10, and all observations of workers with hourly wages less than \$1.

¹⁰ In particular, Galvin (2016); Eastern Research Group (2014); and Cooper and Kroeger (2017).

¹¹ See National Bureau of Economic Research (NBER) CPS Labor Extracts 1979-2006, <https://data.nber.org/morg/docs/cpsx.pdf>. See also Cooper and Kroeger (2017)'s preference for this method of estimating wages.

¹² Eastern Research Group (2014).

¹³ "If the employer did not employ more than 500 piece rate work days in any calendar quarter of the preceding calendar year, the employer's hand harvesters and pruning laborers who are paid on a piece rate basis are exempt from minimum wage for the entire following year." Oregon BOLI, "Minimum wage and overtime in agriculture," <https://www.oregon.gov/boli/employers/Pages/minimum-wage-and-overtime-in-agriculture.aspx>

¹⁴ Oregon BOLI, "Domestic Workers," <https://www.oregon.gov/boli/workers/Pages/domestic-workers.aspx>

In several cases, related industries were combined into a larger group to account for a lack of data within the subindustry categories. All manufacturing subindustries except for food manufacturing are combined here into “manufacturing (except food)”; food manufacturing both (a) is one of the largest manufacturing subindustries and (b) has a particular history of wage violations, and thus was analyzed separately here. Additionally, “agriculture” and “forestry, logging, fishing, hunting, and trapping” were combined into a single “agriculture” category; “finance” and “insurance” were combined into a single “finance and insurance” category; and all “information” subindustries—including publishing, motion picture and sound recording, broadcasting, telecommunications, and internet service providers—were aggregated into a single “information” category. Minimum wage violation estimates for “rental and leasing services” were found to be non-significant, and were thus excluded from the analysis (note: “rental and leasing services” accounts for 0.31 percent of employment in Oregon).

Finally, a note on measurement error in the CPS data. There is reason to believe that the measurement error in the CPS may actually bias *downward* the estimates of minimum wage violations reported below.¹⁵ First, despite going to great lengths to reach them, both Latinx households and undocumented immigrants are underrepresented in the CPS.¹⁶ Because workers in these groups are at higher risk of experiencing minimum wage violations, the estimates of violations reported here should in this sense be considered conservative estimates.¹⁷ 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.¹⁸ 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.¹⁹ Roemer does find that the CPS reaches more “underground” workers than other large-scale surveys and is less biased than alternatives.²⁰ These considerations notwithstanding, the fact that measurement error surely exists recommends using caution when working with the point estimates reported.

¹⁵ 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 Eastern Research Group (2014), Appendix B.

¹⁶ 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.” Annette Bernhardt et al., *Broken Laws, Unprotected Workers: Violations of Employment and Labor Laws in America’s Cities* (New York: National Employment Law Project), 56.

¹⁷ Bernhardt et al. (2009); Eastern Research Group (2014).

¹⁸ Christopher R. Bollinger, “Measurement error in the Current Population Survey: A nonparametric look,” *Journal of Labor Economics* 16, no. 3 (1998).

¹⁹ Marc Roemer, *Using administrative earnings records to assess wage data quality in the March Current Population Survey and the Survey of Income and Program Participation* (Washington, DC: Center for Economic Studies, US Census Bureau, 2002); Eastern Research Group (2014).

²⁰ Roemer 2002.

Appendix III. Estimated Minimum Wage Violations Rates by Industry (with confidence intervals), Oregon, 2010-2020

| Industry | Nonurban Counties (95% CI) | Portland Metro (95% CI) |
|--|---------------------------------------|------------------------------------|
| Accommodation | 10.1% (5.0, 15.1) | 16.2% (12.2, 20.2) |
| Administrative and support services | 6.7% (5.0, 8.4) | 11.2% (7.4, 15.0) |
| Agriculture and Forestry | 11.6% (7.4, 15.7) | 14.5% (11.0, 18.0) |
| Arts, entertainment, and recreation | 8.9% (6.4, 11.5) | 16.3% (10.7, 22.0) |
| Construction | 1.3% (0.5, 2.0) | 2.0% (0.8, 3.2) |
| Educational services | 4.6% (3.4, 5.9) | 6.6% (4.3, 9.0) |
| Finance and Insurance | 2.0% (0.9, 3.0) | 2.5% (1.2, 3.8) |
| Food services and drinking places | 14.5% (11.5, 17.6) | 21.6% (17.4, 25.8) |
| Health care services, except hospitals | 4.9% (2.6, 7.3) | 7.5% (4.2, 10.7) |
| Hospitals | 2.3% (1.2, 3.3) | 2.8% (1.5, 4.1) |
| Manufacturing | 2.6% (1.7, 3.5) | 3.7% (1.7, 5.7) |
| Membership associations and organizations | 4.2% (2.5, 5.9) | 7.0% (4.1, 9.9) |
| Personal and laundry services | 12.0% (9.7, 14.3) | 15.6% (12.6, 18.6) |
| Private households | 30.0% (19.8, 40.3) | 34.0% (22.3, 45.7) |
| Professional, Scientific, and Technical Services | 2.3% (1.6, 3.0) | 3.0% (2.2, 3.8) |
| Retail trade | 8.3% (7.1, 9.5) | 13.3% (9.0, 17.6) |
| Social assistance | 9.6% (7.4, 11.8) | 12.8% (10.5, 15.1) |
| Transportation and warehousing | 4.9% (3.5, 6.4) | 7.4% (5.7, 9.1) |
| Wholesale trade | 2.0% (1.2, 2.8) | 3.9% (2.1, 5.7) |

Appendix IV. Select statistics by industry, Oregon, 2010-2020

| Industry | Average MWV Estimate | Percent of total OR employment | Complaints | Complaints/ 10,000 workers | Violations/ 10,000 workers |
|--|----------------------|--------------------------------|------------|----------------------------|----------------------------|
| Private households | 33.9% | 0.6% | 16 | 17 | 3390 |
| Food services and drinking places | 18.1% | 9.2% | 1270 | 92 | 1810 |
| Personal and laundry services | 13.8% | 0.9% | 123 | 89 | 1380 |
| Accommodation | 13.2% | 1.8% | 114 | 43 | 1320 |
| Agriculture | 13.1% | 3.3% | 292 | 59 | 1310 |
| Arts, entertainment, and recreation | 12.6% | 1.9% | 103 | 36 | 1260 |
| Social assistance | 11.2% | 3.9% | 54 | 9 | 1120 |
| Retail trade | 10.8% | 13.2% | 399 | 20 | 1080 |
| Administrative and support services | 9.0% | 6.1% | 350 | 39 | 900 |
| Health care services, except hospitals | 6.2% | 8.8% | 294 | 22 | 620 |
| Transportation and warehousing | 6.2% | 4.0% | 293 | 49 | 620 |
| Educational services | 5.6% | 9.5% | 36 | 3 | 560 |
| Membership associations and organizations | 5.6% | 2.0% | 33 | 11 | 560 |
| Manufacturing | 3.2% | 10.3% | 168 | 11 | 320 |
| Wholesale trade | 3.0% | 4.9% | 42 | 6 | 300 |
| Professional, Scientific, and Technical Services | 2.7% | 5.9% | 102 | 12 | 270 |
| Hospitals | 2.6% | 3.9% | 7 | 1 | 260 |
| Finance and Insurance | 2.3% | 3.8% | 47 | 8 | 230 |
| Construction | 1.7% | 6.1% | 698 | 76 | 170 |

Appendix V. Employers with most claims filed against, Oregon, 2010-2020

| Name | Claims | Recoded industry | County | Claim Dates |
|---|--------|-------------------------------------|--------------------------------------|-------------------------|
| FIZZ & BUBBLE, LLC | 51 | Manufacturing | CLACKAMAS | October-December 2019 |
| LEO GENTRY WHOLESALE NURSERY, INC. | 51 | Agriculture | CLACKAMAS/ MULTNOMAH | January 2014-March 2015 |
| MARITIME SERVICES CORP. | 33 | Construction | HOOD RIVER | July 2012-April 2013 |
| CORDOVA ENTERPRISES, INC. | 30 | Food Services and Drinking Places | JACKSON | February-October 2013 |
| ECOCAB PORTLAND, LLC | 29 | Transportation and Warehousing | MULTNOMAH/ COWLITZ (WA) | February-April 2017 |
| EXHIBITION ENTERPRISES, LLC | 27 | Administrative and Support Services | WASHINGTON | March-June 2014 |
| WONG'S KING RESTAURANT GROUP NO. 4, INC. | 24 | Food Services and Drinking Places | MULTNOMAH | May-September 2020 |
| PACIFIC CARGO SERVICES, LLC | 23 | Transportation and Warehousing | CLACKAMAS/ MULTNOMAH | August-December 2013 |
| G.M.R., INC. | 21 | Food Services and Drinking Places | JACKSON | September-November 2017 |
| GR ROGUEWOOD, LLC | 19 | Manufacturing | JACKSON/ JOSEPHINE/ MULTNOMAH | May 2015-March 2016 |
| MARIA DE JESUS ALBA GRANADOS | 17 | Agriculture | MALHEUR | May-November 2011 |
| HWY 30 ROADHOUSE | 15 | Food Services and Drinking Places | CLATSOP | August-December 2013 |
| NAFT PETROLEUM, INC. | 14 | Wholesale Trade | JACKSON | July 2010-July 2013 |
| BOSS'S BURGERS, LLC | 13 | Food Services and Drinking Places | POLK | July-December 2012 |
| EAT ME, DRINK ME LLC | 13 | Food Services and Drinking Places | MULTNOMAH/ THURSTON (WA) | March 2017-June 2019 |
| FREEZETECH SYSTEMS, LLC | 13 | Agriculture | DESCHUTES/ JACKSON | August 2017 |
| PACWEST CONTRACTING LLC | 13 | Construction | DESCHUTES | March 2012 |
| RC'S SMOKIN STEAKHOUSE LLC | 13 | Food Services and Drinking Places | JACKSON | May-October 2014 |
| HOMETOWN BUFFET, INC., A CORPORATION OF MINNESOTA | 12 | Food Services and Drinking Places | MARION/ WASHINGTON/ BEXAR (TX) | April 2020 |
| HYDRATION TECHNOLOGY INNOVATIONS, LLC | 12 | Utilities | LINN/ MARICOPA (AZ) | March-September 2015 |
| JOHNCONNIE, INC. | 12 | Food Services and Drinking Places | LANE | August-October 2012 |

| | | | | |
|--------------------------------------|----|--|--------------------------|---------------------------------|
| SIERRA FARM LABOR CONTRACTOR | 12 | Agriculture | MALHEUR/ DIMMIT (TX) | May 2010-August 2011 |
| CPS RESTAURANTS CORPORATION | 11 | Food Services and Drinking Places | CLACKAMAS/ MULTNOMAH | October 2012- January 2013 |
| HH TREES & TRANSPORTATION LLC | 11 | Agriculture | MARION | December 2017 |
| LOEN NURSERY, INC. | 11 | Agriculture | MARION/ WASHINGTON | September 2017- January 2018 |
| PHOENIX SERVICES, INC. | 11 | Personal and Laundry Services | MULTNOMAH | August-October 2013 |
| RICK BARRETT DRYWALL, INC. | 11 | Construction | CLACKAMAS/ MULTNOMAH | January-November 2010 |
| YAW'S TOP NOTCH, INC. | 11 | Food Services and Drinking Places | MULTNOMAH | February-July 2013 |
| D&M AUTO BROKERS LLC | 10 | Retail Trade | MULTNOMAH | April 2012 |
| FIGARO'S PIZZA OF KLAMATH FALLS | 10 | Food Services and Drinking Places | KLAMATH | February-July 2011 |
| GERMYN'S WALLMASTER SERVICE, INC. | 10 | Administrative and Support Services | LANE | March-October 2015 |
| HENG SHAN BROTHERS RESTAURANT LLC | 10 | Food Services and Drinking Places | CLACKAMAS/ WASHINGTON | June-December 2012 |
| JACK IN THE BOX | 10 | Food Services and Drinking Places | (Various) | June 2010-February 2012 |
| MODERN CONSTRUCTION LLC | 10 | Construction | MARION/ MULTNOMAH | October 2011- August 2013 |
| REVOLUTION FILM GROUP, LLC | 10 | Arts, Entertainment, and Recreation | MULTNOMAH | September 2016- June 2017 |

Appendix VI. Industry groups and examples of highly represented occupations²¹

| Industry | Occupation examples (Occupation code) |
|--|---|
| Agriculture and Forestry (NAICS 11) | <ul style="list-style-type: none"> • Farmworkers and laborers (45-2092) • Logging equipment operators (45-4022) • Agricultural equipment operators (45-2091) • Heavy and tractor-trailer truck drivers (53-3032) • Packers and packagers (53-7064) • Graders and sorters (45-2041) |
| Construction (NAICS 23) | <ul style="list-style-type: none"> • Pipelayers, plumbers, pipefitters, and steamfitters (47-2150) • Construction equipment operators (47-2070) • Helpers, construction trades (47-3010) • Painters and paperhangers (47-2140) • Cement masons, concrete finishers, and terrazzo workers (47-2050) • Secretaries and administrative assistants (43-6010) • Driver/sales workers and truck drivers (53-3030) |
| Manufacturing (NAICS 31-33) | <ul style="list-style-type: none"> • Metal workers and plastic workers (51-4000) • Assemblers and fabricators (51-2000) • Material moving workers (53-7000) • Installation, maintenance, and repair occupations (49-0000) • Business operations specialists (13-1000) • Inspectors, testers, sorters, samplers, and weighers (51-9061) • Material recording, scheduling, dispatching, and distributing workers (43-5000) |
| Wholesale trade (NAICS 42) | <ul style="list-style-type: none"> • Sales representatives (41-4010) • Laborers and material movers (53-7060) • Driver/sales workers and truck drivers (53-3030) |
| Retail trade (NAICS 44, 45) | <ul style="list-style-type: none"> • Retail salespersons (41-2031) • Cashiers (41-2010) • Laborers and material movers (53-7060) • Stockers and order fillers (53-7065) |

²¹ Information obtained from the U.S. Bureau of Labor Statistics' Occupational Employment Statistics database: <https://www.bls.gov/oes/current/oesrci.htm>.

| | |
|---|---|
| | <ul style="list-style-type: none"> • Driver/sales workers and truck drivers (53-3030) • Counter and rental clerks and parts salespersons (41-2020) • Customer service representatives (43-4051) |
| Transportation and warehousing (NAICS 48,49) | <ul style="list-style-type: none"> • Heavy and tractor-trailer truck drivers (53-3032) • Laborers and freight, stock, and material movers, hand (53-7062) • Postal service mail carriers (43-5052) • Light truck drivers (53-3033) • Passenger vehicle drivers, except bus drivers, transit and intercity (53-3058) • Industrial truck and tractor operators (53-7051) • Stockers and order fillers (53-7065) • Flight attendants (53-2031) |
| Information (NAICS 51) | <ul style="list-style-type: none"> • Software and web developers, programmers, and testers (15-1250) • Business operations specialists (13-1000) • Sales representatives (41-3000) • Media and communication workers (27-3000) • Radio and telecommunications equipment installers and repairers (49-2020) • Customer service representatives (43-4051) • Actors, producers, and directors (27-2010) |
| Finance and insurance (NAICS 52) | <ul style="list-style-type: none"> • Customer service representatives (43-4051) • Tellers (43-3071) • Securities, commodities, and financial services sales agents (41-3031) • Insurance sales agents (41-3021) • Loan officers (13-2072) • Insurance claims and policy processing clerks (43-9041) • Claims adjusters, appraisers, examiners, and investigators (13-1030) • Secretaries and administrative assistants (43-6010) |
| Professional, scientific and technical services (NAICS 54) | <ul style="list-style-type: none"> • Software developers and software quality assurance analysts and testers (15-1256) • Accountants and auditors (13-2011) • Lawyers (23-1011) • Management analysts (13-1111) • Paralegals and legal assistants (23-2011) • Computer systems analysts (15-1211) |

| | |
|--|--|
| | <ul style="list-style-type: none"> • Bookkeeping, accounting, and auditing clerks (43-3031) • Civil engineers (17-2051) |
| Administrative and support services (NAICS 561) | <ul style="list-style-type: none"> • Janitors and cleaners, except maids and housekeeping cleaners (37-2011) • Security guards (33-9032) • Laborers and freight, stock, and material movers, hand (53-7062) • Landscaping and groundskeeping workers (37-3011) • Customer service representatives (43-4051) • Office clerks (43-9061) • Packers and packagers (53-7064) |
| Educational services (NAICS 61) | <ul style="list-style-type: none"> • Elementary and middle school teachers (25-2020) • Teaching assistants (25-9040) • Secondary school teachers (25-2030) • Secretaries and administrative assistants (43-6010) • Special education teachers (25-2050) • Education and childcare administrators (11-9030) • |
| Health care (NAICS 621, 622, 623) | <ul style="list-style-type: none"> • Registered nurses (29-1141) • Nursing assistants (31-1131) • Medical assistants (31-9092) • Home health and personal care aides (31-1120) • Medical secretaries and administrative assistants (43-6013) • Dental assistants (31-9091) |
| Social assistance (NAICS 624) | <ul style="list-style-type: none"> • Home health and personal care aides (31-1120) • Preschool teachers (25-2011) • Childcare workers (39-9011) • Social and human service assistants (21-1093) • Teaching assistants, except postsecondary (25-9045) Child, family, and school social workers (21-1021) |
| Arts, entertainment, and recreation (NAICS 71) | <ul style="list-style-type: none"> • Amusement and recreation attendants (39-3091) • Exercise trainers and group fitness instructors (39-9031) • Food preparation and serving related occupations (35-0000) • Office and administrative support occupations (43-0000) • Arts, design, entertainment, sports, and media occupations (27-0000) |

| | |
|--|---|
| | <ul style="list-style-type: none"> • Building and grounds cleaning and maintenance occupations (37-0000) |
| Accommodation (NAICS 721) | <ul style="list-style-type: none"> • Maids and housekeeping cleaners (37-2012) • Hotel, motel, and resort desk clerks (43-4081) • Waiters and waitresses (35-3031) • Maintenance and repair workers, general (49-9071) • Cooks (35-2014) • Gambling dealers (39-3011) |
| Food services and drinking places (NAICS 722) | <ul style="list-style-type: none"> • Fast food and counter workers (35-3023) • Waiters and waitresses (35-3031) • Cooks (35-2014) • Food preparation workers (35-2021) • Bartenders (35-3011) • Dishwashers (35-9021) • Hosts and hostesses (35-9031) • Cashiers (41-2011) • Dining room and cafeteria attendants and bartender helpers (35-9011) • Driver/sales workers (53-3031) • |
| Personal and laundry services (NAICS 812) | <ul style="list-style-type: none"> • Hairdressers, hairstylists, and cosmetologists (39-5012) • Manicurists and pedicurists (39-5092) • Laundry and dry-cleaning workers (51-6011) • Animal caretakers (39-2021) • Parking attendants (53-6021) • Receptionists and information clerks (43-4171) • Massage therapists (31-9011) • Counter and rental clerks (41-2021) • Skincare specialists (39-5094) • Funeral attendants (39-4021) • Morticians, undertakers, and funeral arrangers (39-4031) |
| Membership associations and organizations (NAICS 813) | <ul style="list-style-type: none"> • Labor relations specialists (13-1075) • Secretaries and administrative assistants, except legal, medical, and executive (43-6014) • Office clerks (43-9061) <p>General and operations managers (11-1021)</p> |