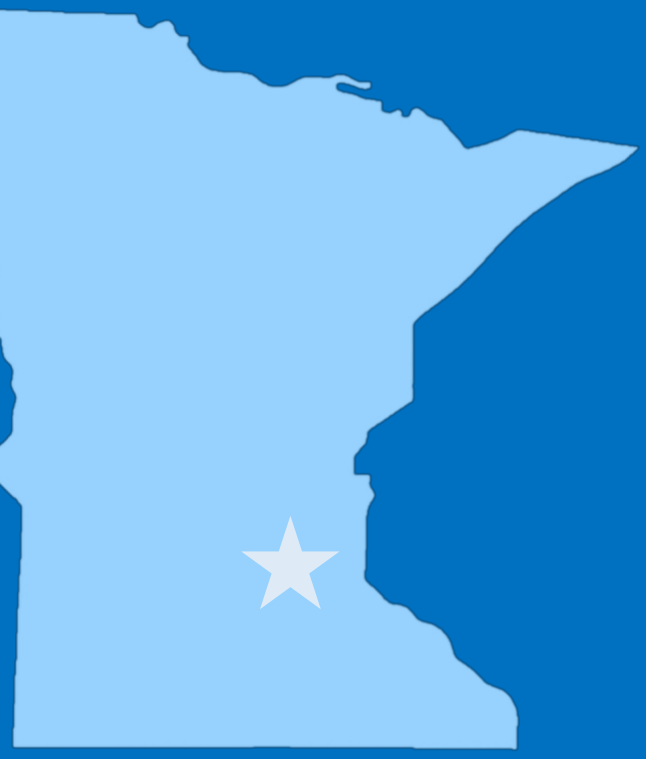

Minimum Wage Non-Compliance in Minneapolis

Report by Jake Barnes, Daniel J. Galvin, Jenn Round, and Janice Fine

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RUTGERS
School of Management and Labor Relations

workplace justice lab@RU

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Introduction

Minneapolis has become an exemplar of aggressive local labor law policymaking. In 2017, the Minneapolis City Council passed a minimum wage ordinance raising the city minimum wage to $15 an hour for large employers (more than 100 employees) by July 2022 and for small employers (100 employees or less) by July 2024. The Minneapolis Labor Standards Enforcement Division (LSED) was created in 2016 to implement the city's new Sick and Safe Time Ordinance and today enforces minimum wage, sick leave, and other wage theft protections. The LSED Workplace Advisory Committee informs the implementation of agency policies and includes representatives from employers, unions, worker centers, and other local advocates. Following the COVID pandemic, Mayor Jacob Frey and a majority of Minneapolis City Council announced their support for creating a city Labor Standards Board to address problems specific to particular sectors.

Despite Minneapolis' legislative commitment to these issues, LSED faces an uphill battle in being able to effectively enforce these policies. With just three investigators tasked to implement and enforce legislation that affects nearly 250,000 Minneapolis workers and their families—a ratio of one investigator for roughly every 83,000 workers—LSED must use its limited resources strategically to ensure employer compliance with these mandates. Using Current Population Survey (CPS) Merged Outgoing Rotation Group data from the U.S. Census Bureau—considered to be among the best publicly available data on hours and earnings—the following memo breaks down minimum wage theft trends in the Minneapolis-St. Paul metropolitan statistical area (MSA, excluding Wisconsin) by industry, job, and worker characteristics. Industry violation estimates are further compared to complaint data from the Minneapolis Labor Standards Enforcement Division (LSED) to begin to understand how employer violation rates and worker complaint rates compare across sectors.

Among our key findings:

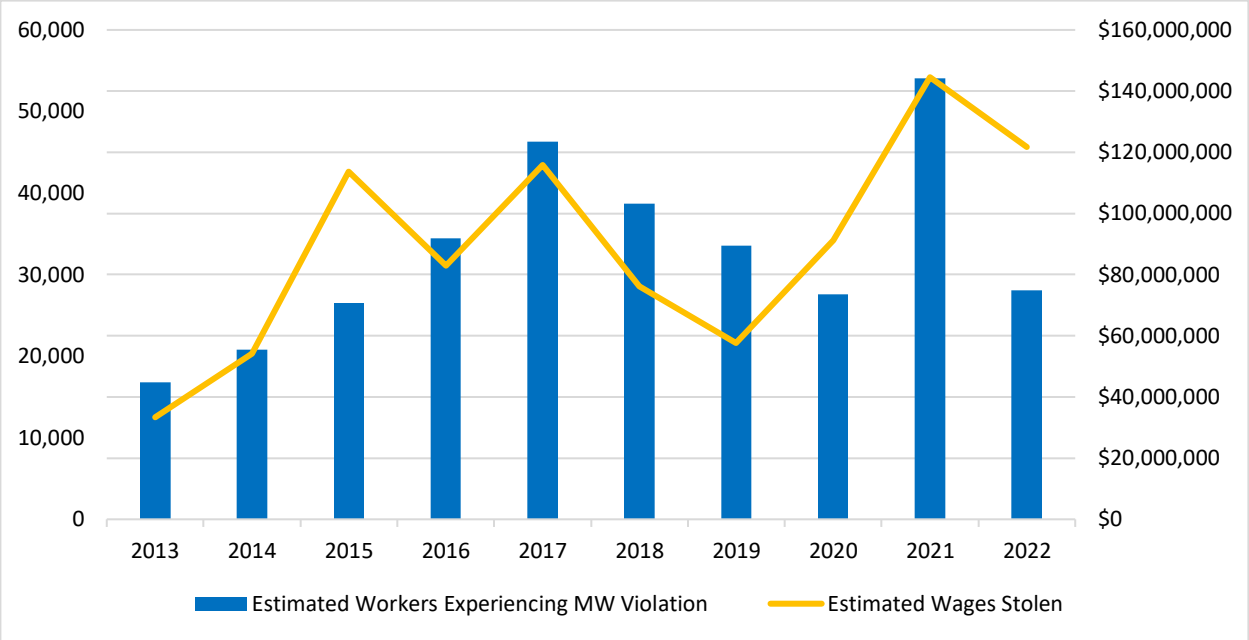
- **Minimum wage violations in the greater Minneapolis-St. Paul metropolitan statistical area (MSA) cost Minnesota workers an estimated $886 million over the past decade,** an average of nearly $90 million a year**.** We estimate that over 32,000 low-wage workers in the metro area are paid below the minimum wage each year, with an average annual underpayment of roughly $2,700 per worker**.**[1]
- Minneapolitans in food services, social assistance, personal and laundry services and arts, entertainment and recreation disproportionately experience minimum wage violations compared to other sectors. Workers in low-wage service jobs related to personal care, food preparation, and landscaping are particularly likely to experience minimum wage theft.
- LSED is alone amongst U.S. local labor standards enforcement agencies in its commitment to directed investigation. The industry violation estimates presented here suggest that LSED is successfully targeting high-violations industries within its proactive efforts, yet violations remain widespread across these industries.
- Black workers and Latinx workers are significantly more likely to experience minimum wage theft than white workers. Workers of intersecting marginalized identities are more likely to experience wage theft; Black female noncitizens are nearly four times as likely to experience a minimum wage violation as a white male citizen.

[1] These figures represent weighted estimates. Methodological details in the appendix.

- Young, female, and part-time workers experience disproportionately high rates of wage theft, as well as those that didn't graduate from high school.
- **There is notable overlap between the highest-violation industries in Minneapolis and the fastest-growing sectors within the greater Twin Cities region, suggesting an urgent need for proactive enforcement efforts.**

Annual Trends, 2013-2022

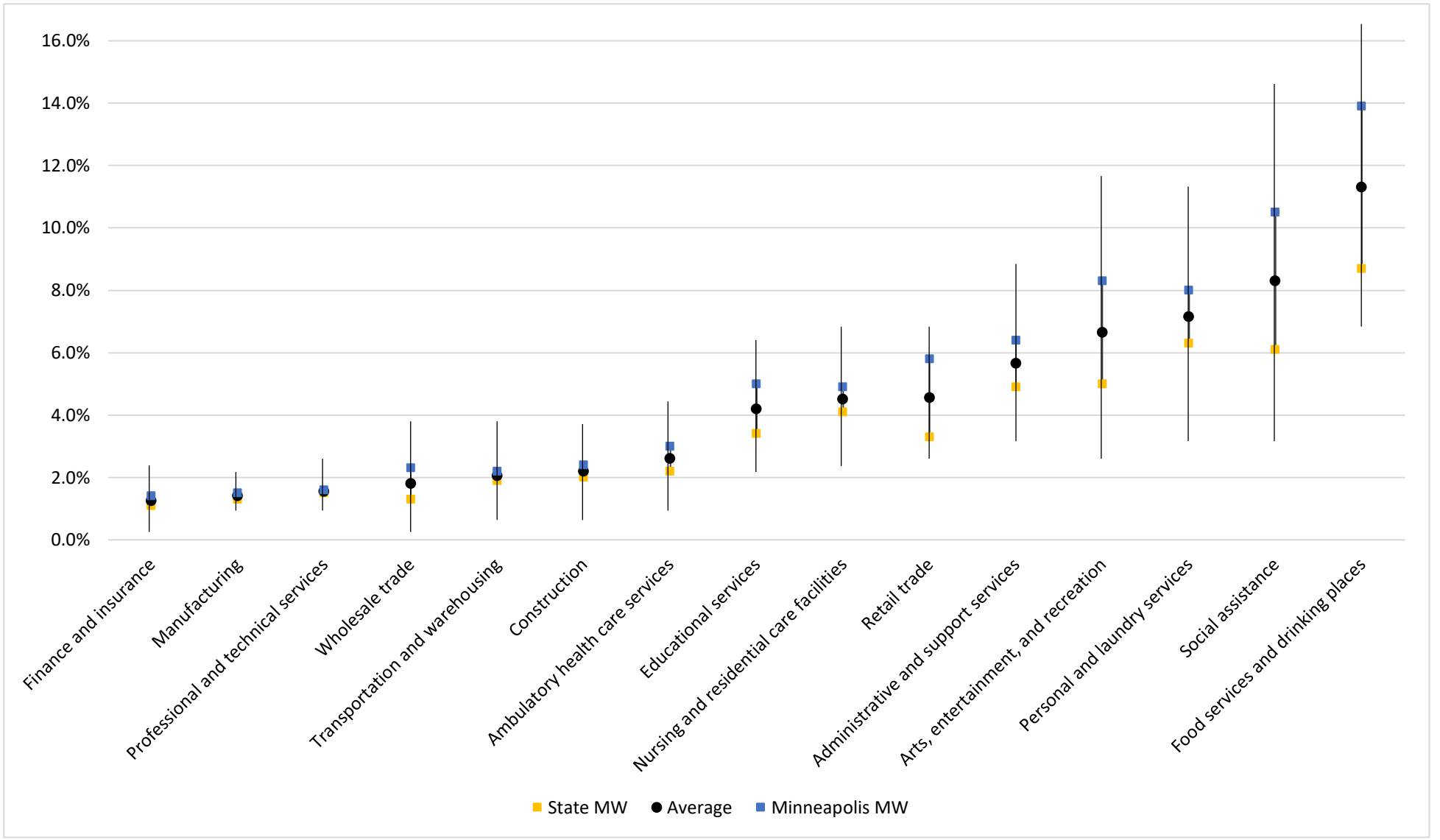
Figure 1. Minimum Wage Violation Estimates by Year (Weighted), Minneapolis-St. Paul MSA (Exc. WI), 2013-22



Year	2013	2014	2015	2016	2017	2018	2019	2020	2021	2022
MW Violation Rate	1.3%	1.6%	2.1%	2.6%	3.1%	3.0%	2.6%	2.2%	4.0%	2.6%

Figure 1 above shows the estimated number of workers experiencing a minimum wage violation for each year from 2013 to 2022, including the total estimated wages stolen per year. **We estimate that minimum wage violations in the greater Minneapolis-St. Paul metropolitan statistical area (MSA) over the past decade cost Minnesota workers an average of nearly $90 million a year.** Over 32,000 low-wage workers in the metro area on average are paid below the minimum wage each year, with an average annual underpayment of roughly $2,700 per worker**.** It is particularly notable that overall violations within the MSA did not rise after the Minneapolis and St. Paul wage increases until the COVID-19 pandemic; annual wages stolen appear to have peaked in 2021, with an estimated 4 percent of eligible workers experiencing a violation and a total of $144.5 million stolen from area workers through unpaid wages in the wake of COVID.

Figure 2. Estimated Minimum Wage Violation Rates by Industry, Minneapolis-St. Paul MSA (Exc. WI), 2013-22



Note: Estimates represent predicted probabilities.
95% confidence intervals shown.

Table 1. Low-Wage Occupations within High-Violation Industries

Industry	Example Low-Wage Occupations
Food services and drinking places (11.3%)	Fast food workers Waiters and waitresses Cooks and food preparation workers Bartenders Dishwashers
Social assistance (8.3%)	Personal care aides Preschool teachers Childcare workers Social and human service assistants Vocational rehabilitation specialists
Personal and laundry services (7.2%)	Hairdressers and cosmetologists Manicurists and pedicurists Laundry and dry-cleaners Parking attendants Animal caretakers Massage therapists
Arts, entertainment, and recreation (6.7%)	Amusement and recreation attendants Gambling service workers Exercise trainers and fitness instructors Locker room and coatroom attendants
Administrative and support services (5.7%)	Janitors and cleaners Security guards Landscapers and groundskeepers Customer service representatives Office clerks
Retail trade (4.6%)	Cashiers Retail salespersons Laborers and movers Stockers and order fillers
Nursing and residential care facilities (4.5%)	Home health and personal care aides Nursing assistants Orderlies Psychiatric Aides
Educational services (4.2%)	Teaching assistants Secondary school teachers

Comparing Violation and Complaint Rates

Figure 2 above shows the highest estimated minimum wage violation rates among industry groups for which estimates could be derived.[2] Industries with the highest violation rates include food services and drinking places (11.3%), social assistance (8.3%), and personal and laundry services (7.2%).

Workers in each of these three industries experience minimum wage theft at over twice the overall city rate of 3.6 percent, suggesting that wage theft in Minneapolis is particularly concentrated in low-wage service sectors. Supplemental analysis of broad occupational categories further substantiates this claim, with sales and related workers (4.2%), building maintenance and groundskeepers (6.8%), food preparation and servers (10.7%), and personal care workers (12.0%) all above the city average. Other industries with violation rates higher than the area average include arts, entertainment, and recreation (6.7%), administrative and support services (5.7%), retail trade (4.6%), nursing and residential care facilities (4.5%), and educational services (4.2%). **Table 1** on the previous page provides examples of common low-wage jobs within these high-violation industries.

Table 2. Minimum Wage Complaints by Industry, Minneapolis-St.Paul MSA (Exc. WI), 2017-2022

Industry	Employment	Public Complaints				Directed Investigations	
		Total	/10k workers	Workers Impacted	/10k workers	Total	Workers Impacted
Food Services and Drinking Places	83,987	**38**	5	401	48	**19**	351
Arts, Entertainment, and Recreation	30,633	**8**	3	123	40	**0**	0
Ambulatory Health Care Services	69,151	**5**	1	20	3	**5**	279
Retail Trade	165,269	**5**	0	40	0	**3**	104
Personal and Laundry Services	29,946	**4**	1	41	1	**1**	1
Real Estate	16,044	**3**	2	31	2	**0**	0
Nursing and Residential Care Facilities	32,897	**3**	1	12	0	**0**	0
Administrative and Support Services	46,443	**3**	1	1	0	**1**	1
Educational Services	107,406	**3**	0	1	0	**2**	67
Social Assistance	37,771	**0**	0	0	0	**9**	66
Other	671,252	7	0	7	0	3	9
Total	1,290,799	**79**	0	**677**	0	**43**	**878**

[2] Several industries were removed from the industry analysis due to lack of sufficient data, including accommodation, private households, and repair and maintenance—for more on this, see the Appendix.

Table 2 shows the industries from which LSED received minimum wage complaints before 2023. Food services and drinking places accounted for roughly half of all 79 minimum wage complaints received (38). The remaining 41 complaints came from industries such as arts, entertainment, and recreation (8 complaints), ambulatory health care services (5), retail trade (5), personal and laundry services (4), nursing and residential care facilities (3), administrative and support services (3), educational services (3), and real estate (3), among others. More than three-quarters of LSED's directed investigations were in either food services and drinking places (19), social assistance (9), or ambulatory health care services (5). Over half of all workers impacted by cases involving minimum wage violations[3] came from just 2 directed investigations and 2 received complaints (3 in the food services industry and 1 home health care service provider).

We can begin to put these numbers into perspective by comparing estimated minimum wage violation rates to relative minimum wage complaints to LSED (i.e., complaints per 10,000 workers). Industries with the highest rate of complaints include food services and drinking places (5 complaints/10,000 workers), arts, entertainment and recreation (3), and real estate (2).

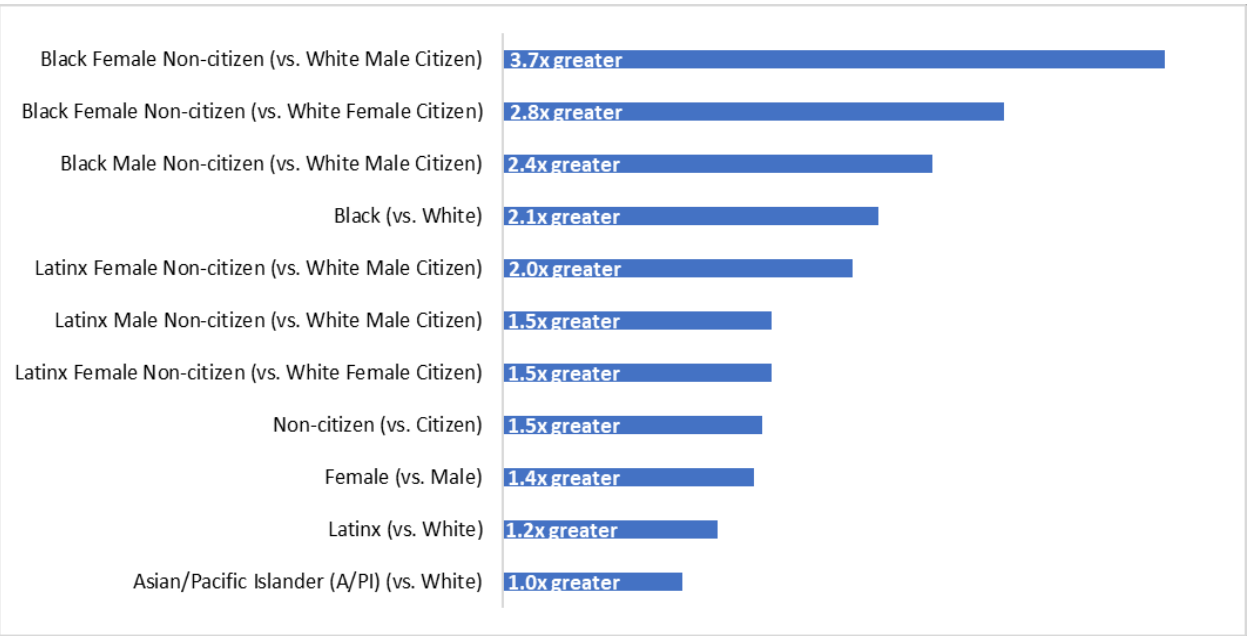
These data make clear that LSED is successfully prioritizing and investigating impactful complaints in high violation industries. The eight high violation industries identified above account for 81 percent of total minimum wage complaints received by LSED. *However, the findings presented here show just how deep and widespread violations are in these industries.* For example, **while 5 complaints were submitted to LSED per 10,000 workers in food services—the highest relative complaint rate of any industry—we estimate that more than 10 percent of workers in the industry have experienced a violation.** Likewise, while investigations in food and drinking services included the most workers relative to total industry employment (90/10,000 workers), these numbers still do not approach the true number of violations. Crafting a targeted enforcement strategy centered around these industries will help to continue to uncover wage theft within these sectors, but it will take additional enforcement resources, interagency cooperation and ultimately increased agency capacity (for more on this, see "Conclusion" on page 8).

Importance of Individual and Job Factors

These data do not tell us exactly *why* some industries have more or fewer violations. Still, it is worth noting that the industries with the highest estimated violation rates tend to employ many women, people of color, and immigrant workers. **Figure 3** shows the probability that workers with particular identities experienced a minimum wage violation relative to a reference group. **Black workers are over twice as likely to be paid under the minimum wage as white and Asian/Pacific Islander (A/PI) workers,** who experience minimum wage violations at roughly the same rates. **Female workers in Minneapolis are 40 percent more likely than male workers to experience minimum wage violations.** The top of Figure 3 moreover shows how intersectionality relates to the experience of wage theft; **Black female noncitizens are nearly three times as likely as white female citizens—and nearly four times as likely as white male citizens—to be paid below the minimum.**

[3] Some workers included in cases involving minimum wage allegations may not have faced minimum wage violations themselves but may be included for other types of alleged violations (e.g., sick and safe time, agreed wage, etc.); see the conclusion (pg. 9) for more on this.

Figure 3. Probability of Minimum Wage Violation by Demographic Group (Relative to Reference Group), Minneapolis-St. Paul MSA (Exc. WI), 2013-22



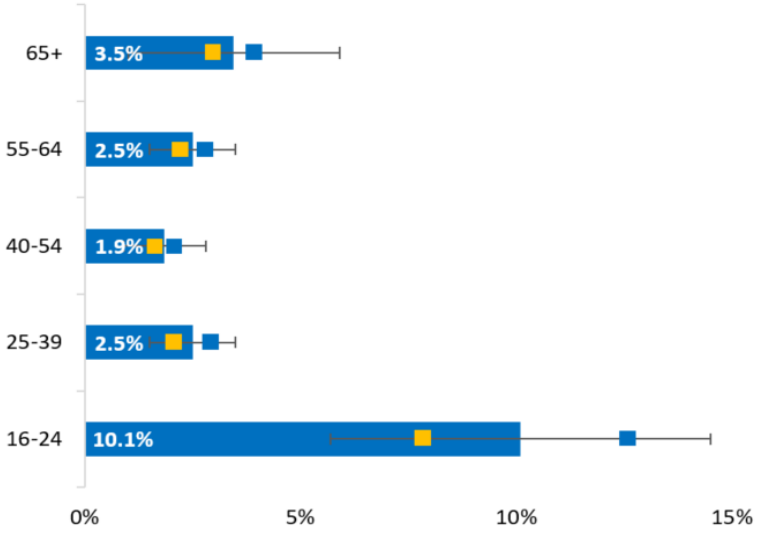
Note: Estimates represent predicted probabilities.

Minimum wage violation rates relative to age group are shown in **Figure 4.** Even when accounting for the state youth wage for those under 18 years of age, **over 10 percent of young workers (i.e., 16-24) are paid below the applicable minimum wage rate—**nearly triple the rate of older workers and quadruple the rate of mid-career workers.

At least somewhat related to this trend in age, **Minneapolis workers without a high school education were paid below the minimum wage at more than quadruple the rate (12.9 percent) of high school graduates (2.9 percent).**

Nearly 8 percent of part-time workers in Minneapolis have experienced a minimum wage violation, compared to just under 2 percent of full-time workers.

Figure 4. Probability of Minimum Wage Violation by Age, Minneapolis-St. Paul MSA (Exc. WI), 2013-22



Note: Estimates represent predicted probabilities.
95% confidence intervals shown.

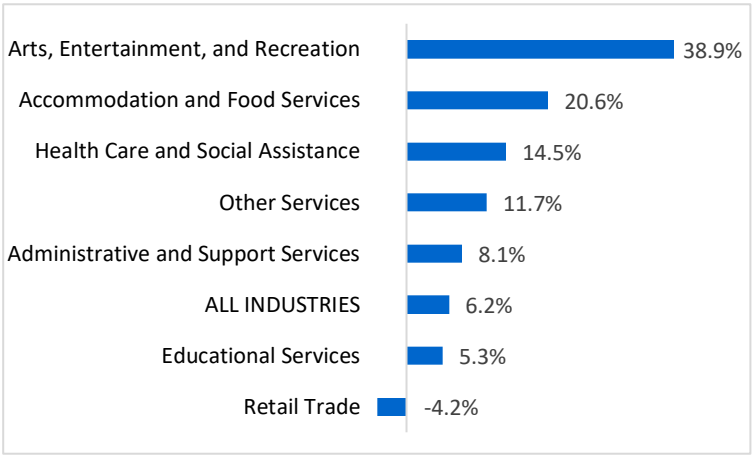
A Snapshot of Small Business

There are 73,087 firms with fewer than 100 employees (the city definition of "small employer" when it comes to minimum wage) employing 558,623 people in the Minneapolis-St. Paul-Bloomington MSA.[4] Past research has shown that the industries at greatest risk of wage and overtime violations are predominantly composed of "microbusinesses" with fewer than 20 employees;[5] indeed, **54 percent of minimum wage complaints received by LSED during the study period were from these particularly small establishments.**

Currently, in most American cities and states, labor enforcement has been largely separated from small business support. Even when these functions are nominally in the same agency or office, they typically do not work together and the opportunity to collaborate and integrate them is lost. A pilot project in Minneapolis led by LSED, WJL@RU and Main Street Alliance is currently working to provide critical back-office systems that small business owners often lack the time and resources to set up. The pilot will subsidize payroll services and bookkeeping services for 30-50 small business owners, focusing on Immigrant, Black, Indigenous, and People of Color (IBIPOC)-owned businesses that have been systematically marginalized. The goal of the project is to set up small businesses for success and growth while also creating tracking systems that enable labor law compliance.[6]

Conclusion

Figure 5. Industry Employment Projections (Select Industries), Seven County Twin Cities Region, 2020-2030



Source: Minnesota Department of Employment and Economic Development (DEED)

The analysis presented above will help to inform a proactive labor standards enforcement strategy in Minneapolis. While LSED is far ahead of where most other city agencies (even those with significantly more resources) are in terms of the number of directed investigations it has originated and the depth of the co-enforcement partnerships it has established, this study makes clear that workers are continuing to experience wage theft at high rates. Racial/ethnic minorities, non-citizens, and female workers are more likely to experience wage violations, particularly when these identities intersect. Young, part-time, non-hourly, and less-educated workers further experience minimum wage theft at higher rates than others.

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[4] 2020 County Business Patterns, Statistics of U.S. Businesses, U.S. Census Bureau (Released May 26, 2023).
[5] Janice Fine and Jennifer Gordon, 2010, "Strengthening Labor Standards Enforcement through Partnerships with Workers' Organizations," *Politics & Society* 38 (4): 552–85, https://doi.org/10.1177/0032329210381240.
[6] For more on this, see https://smlr.rutgers.edu/wjl-ru/beyond-bill-MN.

It is particularly pressing that proactive efforts are targeted toward high violation industries due to their projected growth over the coming years. As shown in **Figure 5**, according to the Minnesota Department of Employment and Economic Development (DEED), employment is projected to shrink in just one of the eight[7] identified high-violation industries—retail trade—over the coming decade. While overall employment within the "Seven County" region[8] is expected to rise 6.2 percent by 2030, **employment in health care and social assistance is projected to grow by over 14 percent; accommodation and food services by over 20 percent; and arts, entertainment, and recreation by nearly 40 percent**. Likewise, many of the low-wage jobs that define work in these sectors are projected to be amongst the fastest growing occupations in the region, including home health and personal care aides (+25,923 employees, 2020-2030), cooks (9,944), fast food and counter workers (8,272), and waiters and waitresses (5,444).[9]

Table 3. High-Violation Industry Employment Projections, Minneapolis-St. Paul MSA, 2020-2030

Industry	MW Violation Estimate	Public Complaints	Directed Cases	Estimated Employment 2020	Projected Employment 2030	Numeric Change 2020-2030	Percent Change 2020-2030
Arts, entertainment, and recreation	6.7%	8	0	24795	34447	9652	**38.9%**
Social assistance	8.3%	0	9	67916	86298	18382	**27.1%**
Personal and laundry services	7.2%	4	1	16695	20487	3792	**22.7%**
Food services and drinking places	11.3%	38	19	91864	110714	18850	**20.5%**
Administrative and support services	5.7%	3	1	88462	95698	7236	**8.2%**
Nursing and residential care facilities	4.5%	3	0	50144	53533	3389	**6.8%**
Total, all industries	*3.6%*	*79*	*43*	*1817290*	*1930563*	*113273*	***6.2%***
Educational services	4.2%	3	2	137141	144455	7314	**5.3%**
Retail trade	4.6%	5	3	153655	147205	-6450	**-4.2%**

The current study is limited to an analysis of unpaid minimum wages in order to compare LSED complaint data with high-quality estimates of violation rates, as reliable data on other types of violations is extremely limited. There is reason to believe, however, that workers experiencing minimum wage violations are likely to experience multiple types of wage and hour violations at the same time. For example, **more than half of all complaints that included a minimum wage allegation also alleged other types of violations,** compared to just 17 percent of all complaints alleging multiple violations. Minimum wage violations in these cases are often particularly

[7] Both social assistance and nursing and residential care facilities are included in the "health care and social assistance" category (along with ambulatory health care services and hospitals). Accommodation and Food Services

[8] Includes Anoka, Carver, Dakota, Hennepin, Ramsey, Scott and Washington counties.

[9] Retrieved from https://apps.deed.state.mn.us/lmi/projections/.

consequential in terms of lost wages; of the $203,158 in total remedies ordered across cases involving a minimum wage complaint, nearly two-thirds ($131,253) were in regard to unpaid minimum wages.

In conclusion, continuing to center proactive enforcement efforts around high-violation industries will help to uncover wage theft within these sectors, but it will take increased agency capacity to address an increasing share of undetected violations. In the U.S. at all levels of government, there is a tendency to silo labor compliance, workforce development, and business development functions into separate agencies. To move the needle on compliance, they need to be working together much more closely. Breaking down silos between different agencies, particularly Community Planning and Economic Development (CPED), the Business Technical Assistance Program (B-TAP) and LSED through interagency cooperation will help to create a more holistic business development and labor compliance regime focused on raising job quality.

In addition to the use of data-driven strategies to efficiently and effectively use agency resources as described in this report, we urge the city of Minneapolis to devote additional resources to its wage and hour enforcement efforts. LSED's 3 investigators currently equates to 1 investigator for roughly every 83,000 Minneapolis workers and 14,000 establishments. Decreasing these ratios by increasing the size of the inspectorate—as well as investing further into co-enforcement partnerships with community organizations—would constitute an important step in creating a more equitable city economy that may continue to support both small business and Minneapolitans.

About the Authors

Jake Barnes is a Ph.D. candidate at the Rutgers School of Management and Labor Relations (SMLR) and an Affiliated Scholar with the Workplace Justice Lab@Rutgers University. He holds a M.S. from SMLR and a B.S. from the Cornell University ILR School.

Janice Fine is the Director of the Workplace Justice Lab@Rutgers University. She holds a Ph.D. from MIT in political science and is a professor of labor studies and employment relations at Rutgers SMLR.

Daniel Galvin is the Workplace Justice Lab@Rutgers University's Senior Affiliated Scholar working on strategic enforcement initiatives. He holds a Ph.D. from Yale University and is an associate professor of political science and faculty fellow at the Institute for Policy Research at Northwestern University.

Jenn Round is the Director of the Beyond the Bill program at the Workplace Justice Lab@Rutgers University. She holds a J.D. from George Washington University Law School and a LL.M. from the University of Washington School of Law.

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.

Minnesota graphic on front cover from Vecteezy.com.

Appendix. Data and Methodology

The empirical literature on wage theft and its predictors remains limited due to the difficulty of obtaining accurate and reliable data. Employers that intentionally violate are unlikely to provide honest nor complete depictions of their practices. The hesitance of many aggrieved workers to submit a complaint to a public entity—whether due to immigration status, general distrust of government, or otherwise—leaves enforcement agency complaint data also unable to paint an accurate portrait of the complex and varied forms of wage and hour violations.

Wage theft 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 has used 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.[10]

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 we have employed here is fully consistent with previous research.[11] CPS-MORG data from December 2013 through December 2022 were used to develop the minimum wage violation estimates presented. Data was limited to respondents who were currently employed at the time of the survey. Many of the same workers excluded from FLSA protections are also excluded from both Minnesota state and Minneapolis city law and were thus removed from the analysis, including bona fide executive, administrative, and professional employees; outside salespersons; casual babysitters; taxi drivers; police officers and firefighters; certain religious workers; conservation officers; and seafarers. Some exemptions were unable to be accounted for given the structure of the data, including certain agricultural workers such as corn detasselers.

Several industries were removed from the industry analysis due to a lack of sufficient data, including agriculture; forestry, logging, fishing, hunting, and trapping; mining; utilities; real estate; rental and leasing services; waste management and remediation services; accommodation; repair and maintenance; and private households.

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[10] 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); 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/.

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

For hourly wages, we use variables that include wages earned from overtime, tips, and commissions (OTC) for both hourly and non-hourly workers.[12] 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 non-hourly workers (for whom different sources of wages are not distinguished). Efforts to estimate and subtract OTC from non-hourly workers adds unknown quantities of additional measurement error to this key variable and is not recommended.[13] To ensure our estimates of wage violations are conservative *underestimates*, we follow Cooper and Kroeger (2017) in taking the higher of the reported wage (hourly wage or weekly pay divided by hours worked) for hourly workers who reported both.

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

Minimum wage violations are dichotomous measures of whether an individual's estimated hourly wage was lower than the applicable legal minimum. We use the applicable statutory minimum wage rate as of the date each response was received. All analyses derived from the CPS use survey weights suggested by Davern et. al (2007), which are necessary given the sampling method of the CPS.[14]

To account for potential rounding errors biasing the data, a sensitivity test was performed where a minimum wage violation was instead defined as a case in which the calculated hourly wage was at least $.25 lower than the applicable minimum wage. While these rates were slightly lower, the relative rates across reported industry and occupational groups were not significantly changed.

To develop the total weighted estimate of wages stolen, we first analyzed business data retrieved from Data Axle Reference Solutions' U.S. Businesses Database—containing information on 82 million businesses across the country—to estimate the percentage of businesses within the Minneapolis-St. Paul-Bloomington MSA that fall under each possible combination of state/city minimum wage rates. Given that such a small percentage of employers within Minneapolis are estimated to fall under the city definition of a large employer, we chose to only use the city small employer rate in addition to the state small and large employer rates when developing violation estimates; this again gives reason to believe that the overall weighted estimate of wages stolen is an underestimate compared to the true underlying impact of minimum wage violations. As shown in **Figure A1**, this leaves four potential buckets of employers:

1. Employers with *less* than $500,000 in annual sales revenue *within* Minneapolis limits;
2. Employers with *less* than $500,000 in annual sales revenue *outside* Minneapolis limits;
3. Employers with *more* than $500,000 in annual sales revenue *within* Minneapolis limits; and
4. Employers with *more* than $500,000 in annual sales revenue *outside* Minneapolis limits.

[12] 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.
[13] U.S. Department of Labor 2014.
[14] Davern, Michael, et al, "Estimating Regression Standard Errors with Data from the Current Population Survey's Public Use File," *Inquiry* 44: 211-224 (Summer 2007).

Chart A1. Developing weighted estimate of minimum wage theft within Minneapolis-St. Paul-Bloomington MSA (exc. WI)

	In City of Minneapolis	In MSA outside of Minneapolis
Small employer (State)	Small in the city $1,186,461,597 * 9.8% = $116,273,237	Small outside of city $472,316,177 * 34.9% = $164,838,346
Large employer (State)	Large in the city $1,496,824,727 * 14.1% = $211,052,287	Large outside of city $956,392,322 * 41.2% = $394,033,637

Total: $886,197,507

Four sets of estimates regarding both the incidence and magnitude of minimum wage violations were then derived according to each of these four buckets, represented by the blue values in Figure A1. For example, as shown in the upper-right quadrant, we estimate that $472,316,177 in total would have been stolen from Minnesota workers in the Minneapolis-St. Paul-Bloomington MSA over the past decade *if all workers in the MSA were subject to the state small employer minimum wage for all years included within the study*. Likewise, in the lower-left quadrant, we estimate that nearly $1.5 billion would have been stolen from workers *if all workers in the MSA were subject to the state large employer minimum wage before the Minneapolis minimum wage began and the city small employer rate afterward* (since we again are not considering the city large employer rate in this study). We then used the MSA business data from Data Axel to estimate the percentage of employers that fall within each quadrant (estimates in red); multiplied these percentages by each applicable violation estimate; and then added these four weighted values together to get the total weighted estimated impact of minimum wage violations within the Minneapolis-St. Paul-Bloomington MSA over the past decade.

Because CPS data offers no information on employer size or specific location within the MSA, we developed two sets of estimates using a) the state "large employer" rate for all applicable years and b) the city "small employer" rate after it went into effect. In a recent report on the state minimum wage, the Minnesota Department of Labor & Industry acknowledged that the majority of Minneapolis employers fall into these categories:

> Note the definition of "small employer" is different for Minnesota than for either Minneapolis or St. Paul. For Minnesota, small employers are those with less than $500,000 in annual revenue. For Minneapolis and St. Paul, small employers are those with 100 or fewer employees . . . According to data from the U.S. Small Business Administration, businesses in 2012 with one to four employees had

> an average of $406,000 in annual revenues. Extrapolating from this, a business with five employees would have an average of more than $406,000 in annual revenues. Thus, the $500,000 dividing line between "small" and "large" for Minnesota is at the lower end of "small" for Minneapolis . . . In other words, many employers that would be "large" for Minnesota would be "small" for Minneapolis or St. Paul.[15]

Further adding weight to this assumption, according to an analysis of Minneapolis business data from Data Axle Reference Solutions,[16] close to 98 percent of area businesses fall under the city definition of a small employer and the majority fall under the state definition for large employer (55 percent). A robustness check was performed by deriving minimum wage violation estimates using the same methodology but replacing the state "large employer" rates with the applicable "small employer" rates; while violation rates went down across industries (as expected), both the identified set of high violation industries and relative findings across individual and job characteristics remained unchanged, lending additional weight to the findings presented here.

There is reason to believe that the measurement error in the CPS may actually bias downward the reported estimates of minimum wage violations. First, despite going to great lengths to reach them, both Latinx households 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 should in this sense be considered conservative estimates. Second, in Bollinger's study of measurement error in the CPS, he 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 even further. 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. These considerations notwithstanding, the fact that measurement error surely exists recommends using caution when working with the point estimates reported.

Racial and ethnic categories are mutually exclusive. We follow CEPR and EPI in the construction of the race variable. "Black" includes those who identify as Black-white; Black-American Indian; Black-Asian; Black-Hawaiian/Pacific Islander; white-Black-American Indian; white-Black-Asian; white-Black-Hawaiian/Pacific Islander; Black-American Indian-Asian; and white-Black-American Indian-Asian. "Asian" includes those who identify as Asian & Hawaiian/Pacific Islander; white-Asian; white-Hawaiian/Pacific Islander; American Indian-Asian; American Indian-Hawaiian/Pacific Islander; Asian-Hawaiian/Pacific Islander; white-American Indian-Asian; white-American Indian-Hawaiian/Pacific Islander; white-Asian-Hawaiian/Pacific Islander; white-American Indian-Asian-Hawaiian/Pacific Islander. "Other" includes American Indian (only); white-American Indian; other 3 races; other 4 and 5 races. "Hispanic" includes those who identify as Mexican, Mexican-American, Mexicano/Mexicana, Chicano/Chicana, Mexican (Mexicano), Mexicano/Chicano, Puerto Rican, Cuban, Dominican, Salvadoran, Other Hispanic, Central/South American, Central American, (excluding Salvadoran), South American, and any of these categories and white, Black, Asian, or Other.

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[15] See footnote 2, MN Department of Labor and Industry, "Minnesota Minimum Wage Report 2022," retrieved from https://www.dli.mn.gov/business/employment-practices/minnesota-minimum-wage-report-2022.
[16] See https://www.data-axle.com/.