Scioto Analysis
Economics | Public Policy

Minimum Wage

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1   Executive Summary

This November, Ohio voters could decide on a new statewide minimum wage. The proposed Ohio Minimum Wage Increase Initiative would raise Ohio's minimum wage to $15 per hour on January 1, 2026 and could be on the ballot as early as November 5, 2024. [1] This bill would result in an initial increase of minimum wage to $12.45 per hour on January 1, 2025 before the full raise is realized the following year. By 2026, this would amount to a 44% increase from Ohio's current minimum wage of $10.45 per hour, which has been increasing at a rate equal to inflation since 2006.[2] This analysis estimates the economic benefits and costs of this proposed labor policy change.

Based on studies of previous minimum wage increases across the country, we find the proposed increase in the state minimum wage will likely produce benefits to Ohio's economy. If Ohio's minimum wage has similar impacts to what we have seen in other contexts, a higher minimum wage will lead to decreased suicides, gun violence, low-birthweight births, infant mortality, and child neglect, and increased high school graduation rates.

At the same time, a minimum wage increase will lead to new costs for the state economy. Most drastic of the costs will be an increase in underemployment. This will come as a result of employers both laying off and cutting hours of their employees to adjust for increased labor costs. Decreased college enrollment is another possible result of a minimum wage increase as students forgo higher education for better opportunities in the labor market.

We find increasing Ohio's minimum wage to $15 per hour will result in a **net benefit to society between $5 and $45 Billion over the next ten years**, with an average expected net benefit of $25 Billion. The benefit will be driven by saved lives, with the minimum wage leading to an estimated total of 4,000 suicides, firearm homicides, and infant deaths avoided from 2027 to 2036.

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1. Kaufman, J. A., Salas-Hernández, L. K., Komro, K. A., & Livingston, M. D. (2020). Effects of increased minimum wages by unemployment rate on suicide in the USA. *Journal of Epidemiology and Community Health*, *74*(3), jech-2019-212981. https://doi.org/10.1136/jech-2019-212981

2. *Ohio Minimum Wage to Increase in 2024*. (2023, September 29). Ohio.gov; Ohio Department of Commerce. https://com.ohio.gov/about-us/media-center/news/ohio-minimum-wage-to-increase-in-2024

2   Policy Options

We compared the Ohio Minimum Wage Increase Initiative to the baseline of the status quo minimum wage for Ohio. This compares what a $15 minimum wage in 2026 would look like compared to a $10.45 2024 minimum wage in Ohio indexed to inflation. We also compare this minimum wage to a more modest $13 minimum wage, Missouri's minimum wage, and a $16 minimum wage, California's minimum wage.

- **Status Quo:** Minimum wage increases from $10.45 in 2024 with inflation

- **Modest Increase:** Increase minimum wage to $13 per hour, Missouri's minimum wage.

- **Ohio Minimum Wage Increase Initiative:** Increase minimum wage to $15 per hour by 2026.

- **Substantial Increase:** Increase minimum wage to $16 per hour, California's minimum wage

3   Standing

We estimate the benefits to Ohio residents and exclude the impacts on workers living in other states who commute into Ohio for work. Since underemployment in Ohio will theoretically have some spillover impact on communities in neighboring states spurring new employment across the Ohio border, the estimates within this analysis should be considered a conservative estimate of the net benefit of the policy change.

4   Impacts

We estimated how the minimum wage proposal would impact a range of variables seen in the table below.

Table 1

Benefits	Costs
Decreased Suicide Rate	Increased Underemployment
Decreased Gun Violence	Decreased College Enrollment
Decreased Infant Mortality	
Decreased Low-weight Births	
Decreased Child Neglect	
Increased High School Graduation	

5   Suicides

Those who experience financial stress are more than 20 times more likely to attempt suicide in their lifetime.[3]

To estimate the impact increasing the minimum wage will have on Ohio's suicide rate, we utilized Kaufman et al.'s 2020 study. Here, researchers estimated that for every $1 increase in minimum wages in contexts across the country, there is a 3.4% to a 5.9% decrease in the suicide rate among adults aged 18–64 years with a high school education or less.[4]

To monetize the cost of suicide to society, we utilized the Federal Emergency Management Agency's (FEMA) estimate for value of life and adjusted this for inflation.[5] This FEMA valuation is on the low end of federal value of statistical life estimates. This figure came to $9 million, meaning for each life saved, a value of $9 million was accrued to society in the form of risk of death reduction.

Based on the trend in suicide rates over the past twenty years, we assume that suicide rates will continue to increase by 2.5% annually if the policy were not implemented. This means the policy will have greater effect in 2035 compared to 2026 because the suicide rate would have increased dramatically in that 10 year period without the

3. Elbogen, E. B., Lanier, M., Montgomery, A. E., Strickland, S., Wagner, H. R., & Tsai, J. (2020). Financial Strain and Suicide Attempts in a Nationally Representative Sample of US Adults. *American Journal of Epidemiology, 189*(11), 1266–1274. https://doi.org/10.1093/aje/kwaa146

4. Kaufman, J. A., Salas-Hernández, L. K., Komro, K. A., & Livingston, M. D. (2020). Effects of increased minimum wages by unemployment rate on suicide in the USA. *Journal of Epidemiology and Community Health, 74*(3), jech-2019-212981. https://doi.org/10.1136/jech-2019-212981

5. *FEMA Benefit-Cost Analysis (BCA) Toolkit 6.0 Release Notes.* (2020). https://www.fema.gov/sites/default/files/2020-08/fema_bca_toolkit_release-notes-july-2020.pdf

policy change. This a conservative trend estimate considering the exponential nature of this figure's growth in recent years.[6] Here, we estimate the policy will result in a decrease in suicide rate by 3.4%, the low-end estimate by Kaufman et al.

We estimate that raising the minimum wage to \$15 per hour will result in the prevention of nearly 1,600 suicides from 2026-2035. This would mean the benefit to society of decreased suicides over the the 10 years following the minimum wage hikes implementation will be \$14 billion.

6   Gun Violence

In 2021, 1,911 Ohioans were killed by firearms.[7] If 43% of these were homicides, as the ratio is nationally, then 820 Ohioans were killed by firearm homicides in 2021.[8]

Gun violence is associated with economic insecurity. A study from the American Journal of Preventive Medicine found a one percent increase in the state minimum wage relative to the state median income is associated with a 1.3% decrease in firearm homicide rates.[9] This means an increase to a \$15 minimum wage for Ohio could result in a 17% decrease in the firearm homicide rate.

To monetize this impact, we utilize the value of a statistical life given by FEMA of \$9 million.

We assume that there will be continued annual growth in firearm homicide rate by one death per one million residents in absence of policy change. This is a conservative assumption considering the state trend in homicide over the last 10 years.[10]

6. Centers for Disease Control and Prevention. (2023, August 10). *Suicide Data and Statistics.* Www.cdc.gov; Centers for Disease Control and Prevention. https://www.cdc.gov/suicide/suicide-data-statistics.html

7. CDC. (2022, March 1). *Stats of the States - Firearm Mortality.* Centers for Disease Control and Prevention; CDC. https://www.cdc.gov/nchs/pressroom/sosmap/firearm_mortality/firearm.htm

8. Gramlich, J. (2023, April 26). *What the data says about gun deaths in the U.S.* Pew Research Center. https://www.pewresearch.org/short-reads/2023/04/26/what-the-data-says-about-gun-deaths-in-the-u-s/

9. Merrill-Francis, M., Chen, M. S., Dunphy, C., Lennon, N. H., Grady, C., Miller, G. F., & McCourt, A. D. (2024). The Association Between State Minimum Wage and Firearm Homicides, 2000-2020. *American Journal of Preventive Medicine.* https://doi.org/10.1016/j.amepre.2024.01.014

10. Gramluch, J. *What the data says about gun deaths in the U.S., https://www.pewresearch.org/short-reads/2023/04/26/what-the-data-says-about-gun-deaths-in-the-u-s/*

We estimate that from 2026-2035 nearly 1,500 lives will be saved from gun violence if a $15 minimum wage was adopted. This means the net benefit to society in decreased firearm homicides will be $13 billion over that 10-year span.

7 Infant Mortality

In 2021, nearly 600 children died in the post-neonatal stage of life (aged 28 to 364 days).[11] A 2016 American Journal of Public Health Research study estimated that infant mortality rates decrease by four percent for every one dollar increase in the minimum wage.[12]

We assign the same value to child risk of death reduction as we do to adult risk of death reduction. We assume the frequency of infant deaths will neither increase nor decrease over the next ten years. Statewide infant mortality rates dropped 11% from 2011-2021, but all of that change occurred in 2011-2016, and none in the last five years.[13] This means infant mortality rates have been relatively stable in recent years.

We estimate the increase in minimum wage to $15 an hour will result in a 17% decrease in post-neonatal mortality rate. As a result, we estimate that in the 10 years following the minimum wage reaches $15, just over 1,000 infant lives will be saved, generating a net economic benefit of $9.1 Billion for the state of Ohio.

8 Low-Weight Births

In 2022, 8.7% of newborns in Ohio had low-weight births, meaning they were born weighing less than 2,500 grams (5.5 lbs). According to a 2020 study from the Journal of Perinatology, low-birthweight children were associated with an average

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11. *Age at infant death: Ohio, 2021.* (2024, February 1). March of Dimes | PeriStats. https://www.marchofdimes.org/peristats/data?reg=39&top=6&stop=106&lev=1&slev=4&obj=1&sreg=39

12. Rokicki, S., Reichman, N. E., & McGovern, M. E. (2023). Association of Increasing the Minimum Wage in the US With Experiences of Maternal Stressful Life Events. *JAMA Network Open*, *6*(7), e2324018–e2324018. https://doi.org/10.1001/jamanetworkopen.2023.24018

13. March of Dimes, *Mortality and Morbidity*

cost of $114,437 in medical expenses in the first year of their lives.[14]

The aforementioned 2016 American Journal of Public Health Research study found that for every one dollar increase in minimum wage there is a one to two percent decrease in the rates of low-weight births.[15]

We assume a one percent decrease in low births per one dollar increase in minimum wage, on the low end of estimates from the Journal of Public Health Research study. We further assume no change over time in rates of children born at low birthweight as rates have not changed dramatically over the last 10 years.[16]

We estimate the proposed increase in minimum wage would result in 9,400 less low-weight births over the ten years following the rate change and save Ohioan families over $1 billion in medical expenditures over that time period.

9   Child Neglect

In 2021, there were 41,640 neglect investigations of children ages 0-12 in Ohio.[17] Child neglect can result in serious issues such as negative impacts on brain development and increased risk of chronic disease, mental health diagnoses, learning disorders, substance, abuse, teen pregnancy, and criminal behavior. Each of these factors lead to public spending on child welfare, medical costs, criminal justice, special education, and lost productivity of children amounting to $1.1 million (2024 dollars) per child over their lifetime. This amounts to $15,000 annually over the average Ohio lifespan of 75.3 years.

A 2016 Children and Youth Services Review study found that for every dollar increase in the minimum wage, there is a 9.6% decline in neglect reports among

14. Beam, A. L., Fried, I., Palmer, N., Agniel, D., Brat, G., Fox, K., Kohane, I., Sinaiko, A., Zupancic, J. A. F., & Armstrong, J. (2020). Estimates of healthcare spending for preterm and low-birthweight infants in a commercially insured population: 2008–2016. Journal of Perinatology, 40(7), 1091–1099. https://doi.org/10.1038/s41372-020-0635-z

15. Rokicki, S., Reichman, N. E., & McGovern, "Association of Increasing the Minimum Wage in the US With Experiences of Maternal Stressful Life Events."

16. *Low birthweight: Ohio, 2018-2021 Average.* (2024, January 1). March of Dimes | PeriStats. https://www.marchofdimes.org/peristats/data?reg=99&top=4&stop=43&lev=1&slev=4&obj=9&sreg=39

17. *Ohio.* (n.d.). Cwoutcomes.acf.hhs.gov. https://cwoutcomes.acf.hhs.gov/cwodatasite/pdf/ohio.html

children primarily ages 0-12.[18]

Utilizing these numbers, we estimate the increase to a $15 minimum wage would result in 78,000 less neglect reports over the first ten years after policy implementation. This would lead to $300 million in avoided social spending.

Our figure assumes 100% of neglect reports reflect true cases of neglect. Considering the underreporting of neglect, though, our estimate is likely an underestimate of the true prevalence of child neglect in Ohio. Furthermore, 1,750 children died in 2020 in Ohio from abuse or neglect, a factor not accounted for in our monetization. These factors suggest the increased minimum wage could have an even greater effect on child neglect than our estimates show.

10   High School Graduation

Ohio had a high school graduation rate of 90.8% in 2024, ranking 25th in the United States for high school graduation.[19] A 2011 study found that a high school graduate will make on average $11,522 (2024 dollars) more than an average dropout.[20] The Washington State Institute for Public Policy credits the high school degree with 39% of this increase.[21] Using this figure, we estimate the average increased value per graduate annually is $4,500.

18. Raissian, K. M., & Bullinger, L. R. (2017). Money matters: Does the minimum wage affect child maltreatment rates? *Children and Youth Services Review, 72*, 60–70. https://doi.org/10.1016/j.childyouth.2016.09.033

19. Woolard, J. C. (2022). Ohio School Report Cards Highlight Continued Growth. https://education.ohio.gov/getattachment/Topics/Data/Report-Card-Resources/Annual-Reports-and-Information/State_Report_Card.pdf.aspx?lang=en-US#:~:text=Ohio%20School%20%26%20District %20Results%202022%2D2023%20%7C%20Page%204&text=The%20four%2Dyear%20graduation%20rate

20. *The High Cost of High School Dropouts: What the Nation Pays for Inadequate High Schools.* (2011). https://all4ed.org/wp-content/uploads/2013/06/HighCost.pdf

21. Washington State Institute for Public Policy. Benefit-Cost Technical Documentation. Olympia, WA: Washington State Institute for Public Policy, December 2019.

In a 2021 study, researchers estimated that for every 10% increase in minimum wage there was a 0.5- to 1-percent percentage point decrease in the dropout rate of students with one or more parents who failed to receive a high school degree.[22] This group comprises almost 77,000 children in the state of Ohio. According to this study, the dropout rate among these children is nine to twelve percent.

If Ohio has similar results to those found in the 2021 study, we estimate that the increase to $15 will lead to 2,700 more high school graduates over the next ten years, which will generate a social value of $160 million in increased wages for these graduates.

This study analyzes the impact of minimum wage on high school graduation of a niche sample of the student population. The impacts of the minimum wage on teens outside this group could be greater than what is shown here.

11   Unemployment

The increased minimum wage will mean an increase in labor costs for business owners in the state. As a result of this, it is likely that some Ohio workers will see layoffs and hours cut.

Assuming the average employee works 40 hours a week, a layoff would result in the loss of 2,080 hours of productivity. At the wage of $15 an hour, this means each employee laid off will result in the loss of $31,200 annually. This is a high-end estimate of the cost of lost wages since each of these workers will have a wage below the new minimum wage.

Utilizing estimates from the Congressional Budget Office, we assume that for every one percent increase in the minimum wage we should expect a 0.25% decrease in the number of people employed in the workforce.

This suggests the increase in minimum wage could result in loss of employment of 73,000 employees, generating a social cost of $22.7 Billion in lost wages over the following 10 years.

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22. Smith, A. A. (2021). The minimum wage and teen educational attainment. *Labour Economics*, *73*, 102061. https://doi.org/10.1016/j.labeco.2021.102061

People who lose jobs will often reallocate their time to nonmarket work such as education, child rearing, or caring for elderly family members, and other uses of time. The value of these new uses of time are not estimated in this analysis.

12   College Enrollment

In Fall of 2022, nearly 170,000 students were enrolled in community colleges in Ohio. Only 31% of these students move on to pursue a bachelor's degree. Those with an associates degree go on to make on average $400,000 more than a high school graduate. Those with an associates degree go on to make $1.2 million more than the average high school graduate. From here we assume an average graduation from a 2-year institution graduates at 20, and at 22 from a 4-year institution. This income will be earned until retirement. Assuming the average retirement age is 64, the average associates-degree holder will work 44 years, while a bachelor's degree holder will work 42 years. This means the average associates degree is worth $9,090 annually and a bachelor's is worth $25,600 per year for the remainder of their career. We then discounted future dollars, as money earned today is worth more than that in 10 years.

A 2023 study from the National Bureau of Economic Research found that increases in state minimum wages, regardless of their size, have resulted in an average enrollment reduction of just over 4% at two year institutions each year for the following 4 years.

Using these parameters, we estimate that in the 10 years following a minimum wage increase, 61,000 fewer Ohioans will receive an associates degree and 28,000 fewer will earn a bachelors degree, a total of 89,000 fewer Ohioans with higher education. The cost of this amounts to $5.8 billion in lower present wages.

13   Discounting

For each impact we utilized a discount rate for future impacts of 3%. This is higher than the suggested discount rate in the revised Circular A-4, the document governing cost-benefit analysis for federal agencies. This rate is a widely-utilized social discount rate reflecting social time preference for costs and benefits.

14   Results

Table 2 shows the impact-by-impact results of our analysis. Suicide, gun violence, and infant death reductions make up the bulk of benefits generated by an increased minimum wage. Unemployment has the largest negative impact on the economy. All in all, our conservative model estimates $9.5 billion in net benefits over the first ten years after implementation of the minimum wage increase.

Benefits		Costs	
Suicides	$14,000 million	Unemployment	$(22,700 million)
Gun Violence	$13,400 million	College Enrollment	$(5,800 million)
Infant Mortality	$9,100 million		
Low-birthweight births	$1,000 million		
Child Neglect	$300		
High School Graduation	$160		
Total	$37.1 billion		$(28.5 billion)
NPV	$9.5 billion		
BCR	1.3		

Most of the benefit of the minimum wage increase will be realized in the form of reduced risk of death. We estimate the policy change will lead to 4,000 fewer deaths in its first ten years, preventing over 1,500 suicides, 1,400 firearm homicides, and 1,000 infant deaths.

Table 2

Cause	Lives Saved
Decreased Suicides	1,550
Decreased Gun Violence	1,450
Decreased Infant Mortality	1,000
Total	**4,000**

In addition to lives saved, we estimate a number of other impacts. Below are estimates of the impact of the policy on birthweight, child neglect, high school and college graduation, and unemployment.

Table 3

Item	Amount
Fewer Low-birthweight Births	9,400
Fewer Neglect Cases	78,000
More High School Graduates	2,700
More Underemployed Ohioans	73,000
Fewer higher education degrees attained	89,000

15   Alternative Policies

We also estimated the impact of alternate minimum wages on Ohio's economy. Table 5 shows results from our model for a $13 minimum wage, $15 minimum wage, and $16 minimum wage.

Table 4

Policy Option	Net Present Value (Millions of $)
Modest Increase: $13 Minimum Wage	$11,000
Ohio Minimum wage Increase Initiative: $15 Minimum Wage	$9,500
Substantial Increase: $16 Minimum Wage	$7,900

We see the more modest $13 minimum wage has larger net benefits than the proposed plan and that the more generous $16 minimum wage has smaller net benefits. We also find that over time the gap between these two narrows as more long-term benefits are realized by the more generous minimum wage policies.

16   Sensitivity Analysis

We utilize conservative assumptions throughout this study, in most cases assuming the weakest impacts of the minimum wage on social impacts that generate benefits to society and the strongest impacts of the minimum wage on impacts that generate costs for society. Conducting sensitivity analysis helps us further understand how the future might pan out if we adjust assumptions made in our model.

17   Monte Carlo Simulation

We conducted a Monte Carlo Simulation: a simulation with 10,000 trials, varying the inputs to our model for each scenario. Within each trial of the Monte Carlo simulation we randomized the following variables:

Table 5

Variable	Lower Bound	Higher Bound	Rationale
Value of Statistical Life	$9,000,000	$13,250,000	Our low bound is taken from FEMA and high bound from the Department of Transportation.
Decrease in suicide rate per $1 increase in minimum wage	3.4%	5.9%	Figures from Kaufman et al (2020).
Decrease in low-birthweight birth rate per $1 increase in minimum wage	1%	2%	Figures from Kaufman et al (2020).
Decreased dropout rate per 10% increase in minimum wage	0.5%	1%	Figures from Smith (2021)
Increase in underemployment per 1% increase in minimum wage	0%	0.6%	Figures from CBO's minimum wage model
Forecasted annual increase in suicide rate	0.5%	4%	Based on past suicide statistics reported by the Centers for Disease Control and Prevention.
Forecasted annual increase in firearm homicide rate	-0.00000125	+0.000002	Figures based on trend data from Pew Research Center.

Table 6: Monte Carlo Results (billions of $)

5th Percentile	Average	95th Percentile
$4.9	$25.0	$45.0

Because our model used the most conservative estimates for each input, our Monte Carlo results suggest that a $15 minimum wage could have an even higher net present value. Our Monte Carlo simulations show that the average 10-year net benefit to society from the $15 minimum wage was $25 billion. This is 170% greater than our model's findings. We find our results ranged from $4.5 to $45 Billion in 90% of simulations.

18   Break Even / Partial Sensitivity Analysis

To estimate how robust our findings were, we varied key variables to see how much they would need to change for the minimum wage increase to result in a net present value of zero.

To do this we adjust our two largest variables: value of a statistical life and percent change in underemployment per 1% increase in minimum wage.

From adjusting our value of a statistical life we found that in 2026 the value per life would have to be $5.7 million, and in 2035 $7.7 million for economic costs of the policy to outweigh benefits. This means the value of a statistical life would need to be 63% of low-end estimates of value of a statistical life in 2026 and 86% in 2035 for there to be a net present value of zero from the policy change. This demonstrates two key insights: the robustness of positive net present value and how important a factor human lives are to the net present value of proposed minimum wage increases.

By adjusting our underemployment variable, we found our labor force would need to decrease by 0.39% per 1% increase in minimum wage in 2026 for there to be a net present value of zero of the proposed minimum wage increase. Under this scenario, 112,000 people would lose employment. Furthermore, in 2035 0.32% of the labor force would need to have lost complete employment per 1% increase in the minimum wage and remain unemployed for there to be a net present value of zero. This would entail 93,000 employees losing employment