

# Chicago Fed Letter

## How does a federal minimum wage hike affect aggregate household spending?

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This article finds that a federal minimum wage hike would boost the real income and spending of minimum wage households. The impact could be sufficient to offset increasing consumer prices and declining real spending by most non-minimum-wage households and, therefore, lead to an increase in aggregate household spending. The authors calculate that a \$1.75 hike in the hourly federal minimum wage could increase the level of real gross domestic product (GDP) by up to 0.3 percentage points in the near term, but with virtually no effect in the long term.

A central part of President Obama's 2013 State of the Union address was a proposal to gradually raise the hourly federal minimum wage from \$7.25 to \$9. Proponents of a higher minimum wage argue it provides economic stimulus by

putting money into the hands of people who are especially likely to spend the extra income.<sup>1</sup> Opponents say a higher minimum wage forces firms that employ minimum wage workers to cut jobs or raise prices on goods and services. In this *Chicago Fed Letter*, we use estimates from our research to analyze both arguments.<sup>2</sup>

spending. We show that a \$1.75 increase in the minimum wage could raise real GDP by about 0.3 percentage points over the short run (first year). Allowing more workers to lose their jobs or allowing the spending response to be smaller than our baseline estimates lowers our projected impact of the minimum wage hike on real GDP over the short run. In addition, we predict the hike's impact on real GDP to be close to zero over the long run.<sup>3</sup>

We view the minimum wage as essentially a "tax and transfer" program. Firms that have to pay higher wages to their workers respond by raising prices on their goods and services. Higher prices on goods and services offset the income benefit for minimum wage workers and reduce the real income of non-minimum-wage workers who did not get a wage increase. Still, an increase in aggregate household spending can arise if minimum wage workers have a higher propensity to spend—particularly in the short run—than non-minimum-wage workers.

### Whose wages are affected by a minimum wage hike?

Figure 1 highlights the low end of the U.S. wage distribution using data from

### 1. 2012 distribution of wages in U.S. economy

Worker category	Number of workers (in millions)	Share of workers	Total wage payments (\$ billions)	Share of wage payments
\$6–\$7.25/hour	2	0.02	23	0.00
\$6–\$9/hour	15	0.13	204	0.04
\$6–\$10/hour	22	0.19	338	0.07
All hourly workers	69	0.59	2,165	0.43
All workers	117	1.00	5,073	1.00

NOTES: Sample weights are used to make the *Current Population Survey* (CPS) respondents comparable to the work force of the U.S. economy aged 16 years and older. Workers paid below the minimum wage of \$7.25 per hour appear in the CPS mostly on account of measurement errors in self-reported data. Workers whose reported wages fall below \$6 per hour are excluded. Note that tips are included in the wage payment calculations.

SOURCE: Authors' calculations based on data from the U.S. Bureau of Labor Statistics, *Current Population Survey*.

We begin by assessing the number of workers whose wages would be affected by a \$1.75 hike in the hourly federal minimum wage. Next, based on our prior research, we predict the likely effects of an increase in the hourly federal minimum wage on total household income, consumer prices, and aggregate household

the U.S. Bureau of Labor Statistics' *Current Population Survey* (CPS). Approximately 2 million workers, or 2% of the work force, were paid at or just below the current hourly federal minimum wage of \$7.25 in 2012. Roughly 15 million workers, representing 13% of the work force, made \$6–\$9 per hour (i.e., at or somewhat below the proposed new federal minimum). Employers are

*National Income and Product Accounts of the United States* for that year. Most likely this difference arises from an understatement of the earnings of high-income individuals in the CPS, because such individuals are difficult to reach via household surveys. If aggregate wage income has been understated, figure 1 overstates the share of total wage payments going to low-wage individuals.

those earning \$9–\$10 per hour would receive  $\$83 \times \$1.75 \times 7$  million = \$1 billion per quarter, or \$4 billion per year. We also found in Aaronson, Agarwal, and French (2012) that the income response to a minimum wage increase is isolated to the groups of workers at and just above the minimum wage. Therefore, the total income gain for all workers is approximately \$30 billion per year.

**In the near term, a minimum wage hike can stimulate economic activity by putting money into the hands of people who are especially likely to spend it.**

not required to raise the wages of workers already earning above the new minimum wage. However, in practice they may. Therefore, we include an additional 7 million workers who made slightly more than the proposed new federal minimum wage—i.e., those earning \$9–\$10 per hour.

Although a substantial share of workers would be affected by minimum wage legislation, its effect on wage payments would be relatively smaller. We estimate that in 2012 roughly \$200 billion, or 4% of total CPS-reported wage payments, went to workers earning \$6–\$9 per hour, and \$338 billion, or 7% of total CPS-reported wage payments, went to those earning \$6–\$10 per hour.

When inferring the likely impact on total household income, consumer prices, and aggregate household spending from the proposed federal minimum wage hike, we face two important issues. First, 19 states and a handful of cities currently offer a minimum wage above—and sometimes well above—the federal minimum wage. So, if the hourly federal minimum wage were raised by \$1.75, these states and cities might raise their hourly minimum wages above \$9. To partly account for this, we allow earnings and spending to rise somewhat for the wage group earning \$9–\$10 per hour. Second, the aggregate wage income of \$5.07 trillion computed from the CPS for 2012 is lower than the aggregate wage income of \$6.88 trillion reported in the U.S. Bureau of Economic Analysis's

Accounting for this possible overstatement reduces the share of total wage payments going to those making \$6–\$9 per hour from 4% to 3%.

#### **Household income**

Next, we compute what happens to total household income as a result of an increase in the hourly federal minimum wage from \$7.25 to \$9. In Aaronson, Agarwal, and French (2012), we used data from three large, representative data sets—the CPS, the U.S. Census Bureau's *Survey of Income and Program Participation*, and the U.S. Bureau of Labor Statistics' *Consumer Expenditure Survey*—to estimate the impact of a minimum wage hike on household income with adult minimum wage workers. We found that the average real income of households with adult minimum wage workers rose by \$250 per quarter during the first few quarters in response to a \$1 increase in the minimum wage.<sup>4</sup>

If we assume that 15 million workers earning \$6–\$9 per hour in 2012 receive a \$1.75 hourly wage increase and that the income response is proportional to what we found before, aggregate income will rise by  $\$250 \times \$1.75 \times 15$  million = \$6.6 billion per quarter, or roughly \$26 billion during the year immediately following the hike. Those making \$9–\$10 per hour likely receive a smaller income increase than those making less. Assuming that the income increase for those earning \$9–\$10 per hour is only one-third of that for those earning \$6–\$9 per hour (or  $\$250/3 = \$83$ ), we find that

Our analysis in Aaronson, Agarwal, and French (2012) was of adult minimum wage workers—specifically, minimum wage workers who are a household's head and spouse aged 18 and older (or in the absence of a spouse, another working household member aged at least 18). Teenagers (unless they happen to be counted as one of their household's two adult workers) and low-skilled workers without jobs prior to the minimum wage increase were omitted from our analysis. There is some evidence that minimum wage hikes might make it harder to get a job, especially for teenagers, who represent 23% of the minimum wage labor force.<sup>5</sup> We return to this issue later.

#### **Consumer prices**

Using a variety of U.S. and Canadian data, we demonstrated in Aaronson (2001) and Aaronson, French, and MacDonald (2008) that immediately after a minimum wage increase, limited-service restaurants (i.e., fast-food restaurants) employing minimum wage workers pass close to 100% of the higher labor costs on to consumers in the form of higher prices.

We conjecture that other (nonrestaurant) firms employing minimum wage workers or using intermediate inputs requiring minimum wage labor also pass close to 100% of the higher labor costs on to consumers in the form of higher prices.<sup>6</sup> A simple way to predict how a \$1.75 increase in the hourly federal minimum wage affects the price level is to compare the increase in earnings resulting from the hike to the level of real GDP (for aggregate prices) or to the level of total household consumption (for aggregate consumer prices) under the assumption of no unemployment effects. Based on our estimate of a \$30 billion earnings impact in the first year, we calculate

that aggregate prices would rise by 0.19% (= \$30 billion/\$15.685 trillion of 2012 real GDP) and aggregate consumer prices would go up by 0.27% (= \$30 billion/\$11.12 trillion of 2012 total household consumption).<sup>7</sup>

### Aggregate household spending

Finally, to quantify the aggregate household spending response to a federal minimum wage hike, we need to consider the spending of both minimum wage and non-minimum-wage earners in response to the minimum wage hike.

### Minimum wage earner spending

In Aaronson, Agarwal, and French (2012), we found that real spending in households with adult minimum wage workers rises, on average, by approximately \$700 per quarter during the first few quarters following a \$1 hike in the hourly minimum wage. This additional spending, which exceeds the immediate income gain of \$250 per quarter, is primarily on durable goods, particularly new vehicles (financed with credit). Our research shows that these patterns can be partly reconciled by augmenting a standard dynamic model of consumer behavior to allow for the ability to borrow against durable goods. The intuition for this result is simple. Suppose a household must make a 20% down payment on an auto purchase. The existence of this borrowing opportunity implies an extra \$250 per quarter in income can be leveraged up to \$1,250 ( $\$250/0.2 = \$1,250$ ) in additional spending. This amount of spending is well beyond what we find in the actual data, perhaps because some minimum wage households cannot finance nondurable purchases with credit.

The spending estimate of \$700 per quarter in response to a \$1 hike in the hourly minimum wage applies to households with adult minimum wage workers. It seems likely that teenagers, who make up 23% of all minimum wage workers, have less access to credit and therefore will not be able to leverage their earnings. Instead, let us assume that teenage minimum wage workers spend all their income as they earn it. Given the number of teen and adult workers who are likely affected by a \$1.75 hike in the

hourly federal minimum wage (including those earning \$9–\$10 per hour), we calculate that spending among minimum wage households could add as much as \$73 billion to the economy in the year following the hike, which is 0.47% of real GDP and 0.66% of total household consumption in 2012.

### Non-minimum-wage earner spending

Workers who earn above the minimum wage may decrease their real spending as a consequence of a minimum wage hike because they typically face higher product and service prices without the benefit of an earnings boost. Suppose that the spending propensity of non-minimum-wage workers is such that they reduce their real spending by \$800 for every \$1,000 of real income lost.<sup>8</sup> Those losing the \$1,000 of real income through higher prices may not reduce their spending by the full \$1,000 but may instead reduce their savings. We predict that this loss for non-minimum-wage earners results in a \$25 billion decline in real spending in the year following the minimum wage hike.

### Total spending

Combining the estimates for minimum wage earners and non-minimum-wage earners, we predict that an increase of \$1.75 in the hourly federal minimum wage raises aggregate household spending by roughly \$48 billion in the year following the minimum wage hike, or 0.3% of 2012 real GDP.

However, a few words of caution are in order. First, as we mentioned already, our analysis is based on household income and spending responses from samples of adult minimum wage workers who had a minimum wage job before the hike. There is some evidence that minimum wage hikes might make it harder to get a job, especially for teenagers. Additionally, some workers, particularly teenagers, may lose their jobs as a consequence of a minimum wage hike. For these reasons, we introduce “disemployment elasticities” of  $-0.5$  for teenagers and  $-0.25$  for adults (i.e., for every 10% increase in the minimum wage, the employment of teenagers and adults making the minimum wage would fall by 5% and 2.5%, respectively). Our

reading is that these elasticities are at the high end of the literature. Nevertheless, allowing for disemployment of these magnitudes reduces the aggregate spending gain following a \$1.75 hike in the federal minimum wage to \$28 billion, or 0.2% of 2012 real GDP. The aggregate spending gain would decline to zero if we assume a disemployment elasticity of  $-0.7$  for both teens and adults. Therefore, while more disemployment than we allow for is certainly plausible and would clearly lower our estimate of the spending response, it's unlikely to completely eliminate the entire boost to aggregate spending.

Additionally, for those with low income and poor credit scores, it may be harder to purchase cars on credit after the financial crisis than it was during the sample period of 1980–2008, which we used to estimate the spending response. Indeed, our estimated aggregate spending response is high relative to the rest of the literature. Instead, if we assume that the marginal propensity to spend (i.e., the propensity to spend the next dollar) for households with adult minimum wage workers is half as large in the year following a minimum wage hike as what

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we estimate in the data, the aggregate spending response to a \$1.75 increase in the hourly federal minimum wage would be only \$4 billion, or 0.02% of 2012 real GDP. This result highlights the mechanism of our prediction—any additional consumer spending from a minimum wage hike arises from differences in the propensity to spend among different income groups.

Finally, it's important to stress that the aggregate household spending response discussed in this article is relevant for only the first few quarters after a minimum wage hike. Beyond that time frame, households must pay off debt they incurred in the short run by spending less. Thus, a minimum wage hike provides stimulus for a year or so, but serves as a drag on the economy beyond that.

## Conclusion

Proponents of minimum wage increases often claim that minimum wage hikes will significantly boost the economy. We are skeptical that minimum wage hikes boost GDP in the long run. Nevertheless, we do find evidence that putting money into the hands of consumers, especially low-wage consumers, leads to predictable increases in spending in the short run.

<sup>1</sup> See, e.g., New York Times Company, 2013, "From the bottom up," *New York Times*, February 17, available at [www.nytimes.com/2013/02/18/opinion/wages-from-the-bottom-up.html](http://www.nytimes.com/2013/02/18/opinion/wages-from-the-bottom-up.html).

<sup>2</sup> Daniel Aaronson, Sumit Agarwal, and Eric French, 2012, "The spending and debt response to minimum wage hikes," *American Economic Review*, Vol. 102, No. 7, December, pp. 3111–3139; Daniel Aaronson, Eric French, and James MacDonald, 2008, "The minimum wage, restaurant prices, and labor market structure," *Journal of Human Resources*, Vol. 43, No. 3, Summer, pp. 688–720; and Daniel Aaronson, 2001, "Price pass-through and the minimum wage," *Review of Economics and Statistics*, Vol. 83, No. 1, February, pp. 158–169.

<sup>3</sup> For further explanation of the calculations in this article, see [www.chicagofed.org/digital\\_assets/others/people/research\\_resources/aaronson\\_daniel/aaronson\\_french\\_cfl\\_313\\_calculations.xlsx](http://www.chicagofed.org/digital_assets/others/people/research_resources/aaronson_daniel/aaronson_french_cfl_313_calculations.xlsx) and [www.chicagofed.org/digital\\_assets/others/people/research\\_resources/aaronson\\_daniel/aaronson\\_french\\_cfl\\_313\\_calculations\\_documentation.pdf](http://www.chicagofed.org/digital_assets/others/people/research_resources/aaronson_daniel/aaronson_french_cfl_313_calculations_documentation.pdf).

<sup>4</sup> To put this estimate into perspective, note that adult minimum wage employees work, on average, roughly 300 hours per quarter. Under three assumptions—there is no disemployment (i.e., job loss) due to the minimum wage hike, all workers who are paid close to the minimum wage are covered by minimum wage laws, and there is no measurement error—we anticipate a \$1 minimum wage hike to increase each adult minimum wage employee's quarterly earnings by \$300.

<sup>5</sup> U.S. Bureau of Labor Statistics, 2012, "Characteristics of minimum wage workers: 2011," report, Washington, DC, March 2, available at [www.bls.gov/cps/minwage2011.htm](http://www.bls.gov/cps/minwage2011.htm).

<sup>6</sup> Prices and incomes might also rise following a minimum wage hike because of the increase in aggregate demand for goods and services. We do not account for this possibility in our analysis.

<sup>7</sup> Real GDP and total household consumption data are from the U.S. Bureau of Economic Analysis.

<sup>8</sup> See, e.g., Jonathan A. Parker, Nicholas S. Souleles, David S. Johnson, and Robert McClelland, 2011, "Consumer spending and the economic stimulus payments of 2008," National Bureau of Economic Research, working paper, No. 16684, January, available at [www.nber.org/papers/w16684](http://www.nber.org/papers/w16684).