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Memorandum

To: Sen. Michael Sirotkin, Chair, Senate Economic Development, Housing and General Affairs
From: Tom Kavet
CC: Steve Klein, Joyce Manchester, Legislative Joint Fiscal Office
Date: February 8, 2018
Re: Minimum Wage Economic Impact Monitoring Capability

Per your request, I am writing to detail two provisions discussed in recent testimony before the Senate Economic Development, Housing and General Affairs Committee regarding ongoing analysis and data required to monitor and better understand potential economic and fiscal impacts associated with the recently advanced legislation to raise the State minimum wage to \$15 per hour in 2024. These data and related analyses would allow State policymakers to monitor economic impacts associated with this change on a timely and ongoing basis so as to identify and potentially mitigate any negative impacts at the earliest possible date and/or verify beneficial impacts.

The first component of this involves ongoing annual analysis of the growing minimum wage differential between Vermont and New Hampshire. The Vermont minimum wage is currently 45% above that in New Hampshire, the largest differential ever, and could exceed the New Hampshire wage by more than 100% in 2024. The purpose of this analysis would be to determine any obvious economic impacts associated with this persistent and growing differential. The analysis would be based on both currently produced wage and employment data for both states and the development of new data, if possible, with the cooperation of the Departments of Labor in both New Hampshire and Vermont and/or the U.S. Bureau of Labor Statistics. This analysis would review wage, employment and income variations at both the state and county levels by occupation, industry, gender and other employee characteristics over time, so as to identify both positive and negative changes that may be associated with the growing minimum wage differential between the two states. This analysis would initially cost about \$18K, with ongoing annual costs of about \$6-8K.

The second analysis would be based on the regular collection and organization of Vermont data on employment, hours and earnings, similar to the collection effort by the State of Washington for recent analysis on minimum wage changes in the Seattle area. This would allow analysis of both employment impacts and changes in hours worked as a result of minimum wage changes. The monitoring of hours worked is especially important, since labor market effects could show up as either or both job losses or reductions in hours worked. The analytic costs involved in this would be approximately \$26K, with ongoing analytic costs of about \$7-8K. Data collection costs could involve additional expense via the Vermont

Department of Labor and/or be borne by firms now supplying other labor market data on a regular basis. I would be happy to work with DOL to determine exact data collection costs and optimal collection methodologies for this work. Please let me know if you would like me to pursue this.

I believe both of these efforts would provide important and timely information that could guide future public policy decisions related to this issue and guard against any unintended effects associated with the recent legislation advanced by the Committee. If you or others have any questions regarding either of the above analytic constructs, please let me know.



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Memorandum

To: Steve Klein, Chief Fiscal Officer, Joint Fiscal Office
From: Tom Kavet, Nic Rockler
CC: Minimum Wage Study Committee
Date: October 2, 2017
Re: Economic Analysis of Three Minimum Wage Variants, as Requested by the Legislative Minimum Wage Study Committee

ANALYTIC SCOPE

As requested, this memo summarizes potential economic impacts associated with three requested minimum wage change variants:

- 1) \$15.00 per hour, effective in 2022;
- 2) \$13.25 per hour, effective in 2022; and
- 3) \$12.50 per hour, effective in 2021.

For each of these variants, we have assumed increases in accord with current law through calendar 2018, with straight-line phased increases in intervening years between 2018 and 2021 or 2022, with inflationary adjustments thereafter.

Table 1, on the following page, shows the annual nominal dollar values associated with these three variants. All three assume inflation growth, as measured by the U.S. Consumer Price Index (CPI-U), consistent with the official State January 2017 Consensus Forecast and the prior April 2017 analysis of a \$15 per hour minimum wage in 2022.¹

The values used for the current \$15.00 per hour in 2022 variant differ slightly from the prior April analysis, due both to the progression of the annual wage increases between 2018 and 2022 and more recent calculations regarding state and federal net fiscal savings from reduced transfer payments. All other assumptions, data and models, however, including the source Department of Labor (DOL) data, Census American Community Survey (ACS) data, state economic impact model from Regional Economic Models, Inc. (REMI), and other inputs remained constant with the April 2017 analysis so as to allow analysis within the timeframe required by the Committee and to facilitate comparison with the prior April output.

Constant 2017 dollar equivalents to nominal dollar wage levels are displayed in Table 2, on the following page. Note that the constant dollar minimum wage does not always remain exactly level, even when designed to be “adjusted for inflation,” due to the fact that the annual inflation adjustment in statute is based on the prior year change in the CPI, whereas the

¹ See: www.leg.state.vt.us/jfo/issue_briefs_and_memos/Memo%20-%20Minimum%20Wage%20Review%200417%20revised.pdf

constant dollar value of the minimum wage is deflated based on the coincident year change in the CPI.

TABLE 1 – Nominal Dollar Minimum Wage Changes Analyzed

	Nominal \$ Current Law	\$12.50 in 2021	\$13.25 in 2022	\$15.00 in 2022
2015	\$ 9.15	\$ 9.15	\$ 9.15	\$ 9.15
2016	\$ 9.60	\$ 9.60	\$ 9.60	\$ 9.60
2017	\$ 10.00	\$ 10.00	\$ 10.00	\$ 10.00
2018	\$ 10.50	\$ 10.50	\$ 10.50	\$ 10.50
2019	\$ 10.79	\$ 11.17	\$ 11.19	\$ 11.63
2020	\$ 11.13	\$ 11.84	\$ 11.88	\$ 12.75
2021	\$ 11.44	\$ 12.50	\$ 12.56	\$ 13.88
2022	\$ 11.70	\$ 12.78	\$ 13.25	\$ 15.00
2023	\$ 11.93	\$ 13.04	\$ 13.52	\$ 15.30
2024	\$ 12.20	\$ 13.32	\$ 13.82	\$ 15.64
2025	\$ 12.46	\$ 13.61	\$ 14.11	\$ 15.98
2026	\$ 12.74	\$ 13.92	\$ 14.43	\$ 16.33
2027	\$ 13.03	\$ 14.23	\$ 14.75	\$ 16.70
2028	\$ 13.32	\$ 14.56	\$ 15.09	\$ 17.08
2029	\$ 13.63	\$ 14.89	\$ 15.44	\$ 17.48
2030	\$ 13.95	\$ 15.24	\$ 15.80	\$ 17.88

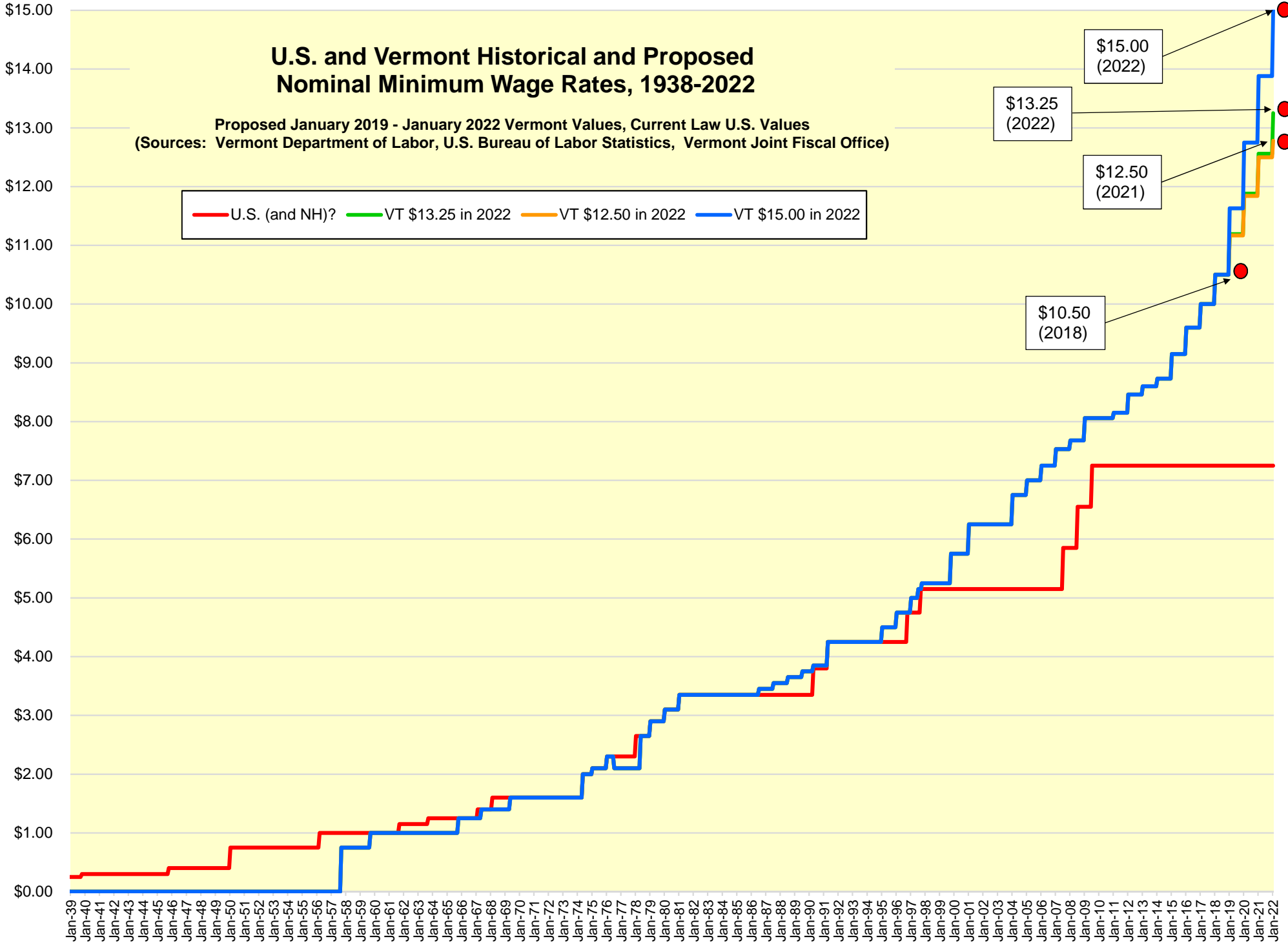
TABLE 2 – Constant Dollar Minimum Wage Changes Analyzed

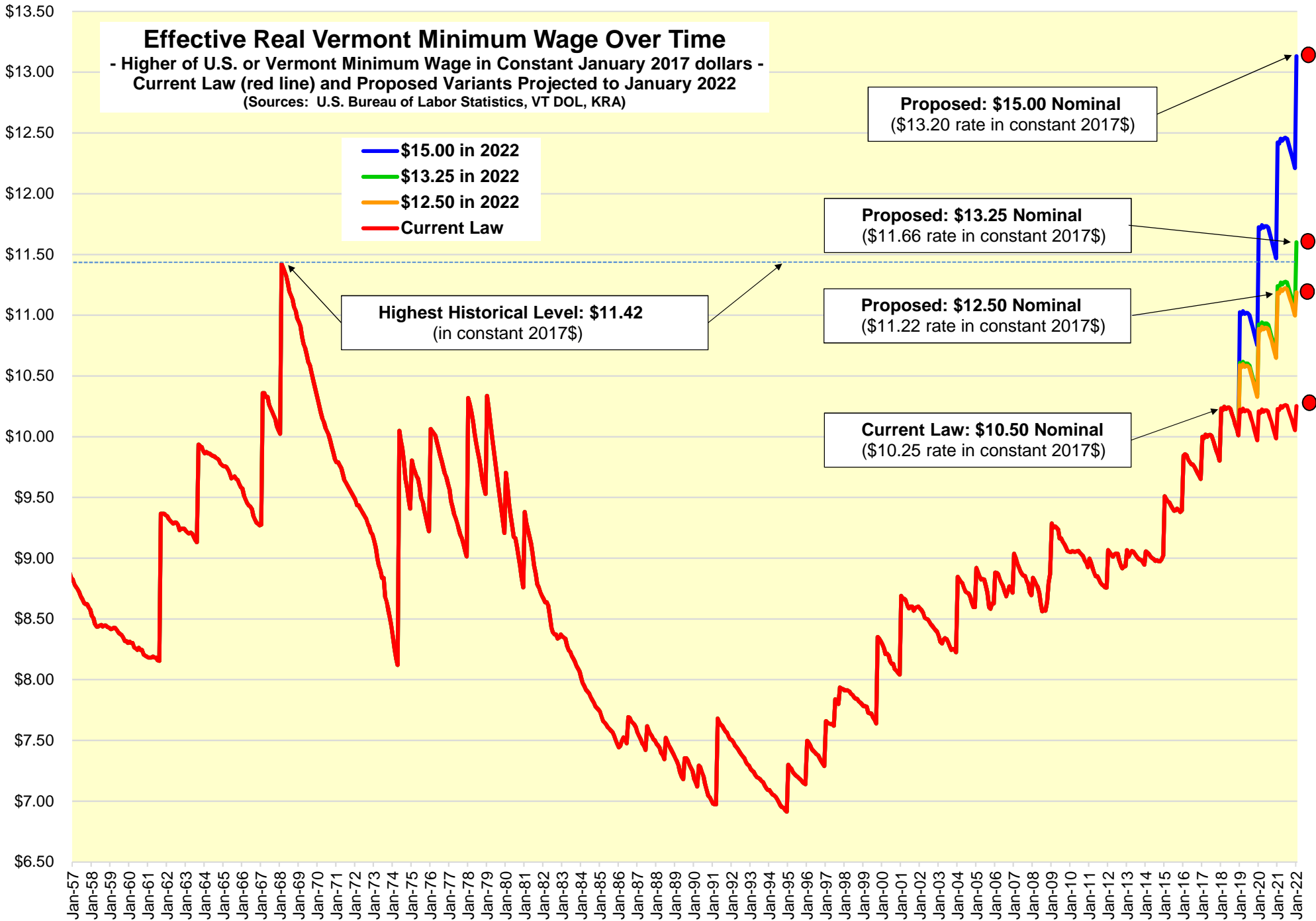
	2017 \$ Current Law	\$12.50 in 2021	\$13.25 in 2022	\$15.00 in 2022
2015	\$ 9.50	\$ 9.50	\$ 9.50	\$ 9.50
2016	\$ 9.85	\$ 9.85	\$ 9.85	\$ 9.85
2017	\$ 10.00	\$ 10.00	\$ 10.00	\$ 10.00
2018	\$ 10.21	\$ 10.21	\$ 10.21	\$ 10.21
2019	\$ 10.18	\$ 10.54	\$ 10.55	\$ 10.97
2020	\$ 10.21	\$ 10.86	\$ 10.90	\$ 11.70
2021	\$ 10.27	\$ 11.22	\$ 11.28	\$ 12.46
2022	\$ 10.29	\$ 11.24	\$ 11.66	\$ 13.20
2023	\$ 10.27	\$ 11.22	\$ 11.63	\$ 13.17
2024	\$ 10.28	\$ 11.23	\$ 11.64	\$ 13.18
2025	\$ 10.27	\$ 11.22	\$ 11.63	\$ 13.17
2026	\$ 10.27	\$ 11.22	\$ 11.63	\$ 13.17
2027	\$ 10.26	\$ 11.21	\$ 11.63	\$ 13.16
2028	\$ 10.26	\$ 11.21	\$ 11.62	\$ 13.16
2029	\$ 10.26	\$ 11.21	\$ 11.62	\$ 13.16
2030	\$ 10.26	\$ 11.21	\$ 11.63	\$ 13.16

U.S. and Vermont Historical and Proposed Nominal Minimum Wage Rates, 1938-2022

Proposed January 2019 - January 2022 Vermont Values, Current Law U.S. Values
 (Sources: Vermont Department of Labor, U.S. Bureau of Labor Statistics, Vermont Joint Fiscal Office)

— U.S. (and NH)?
 — VT \$13.25 in 2022
 — VT \$12.50 in 2022
 — VT \$15.00 in 2022





As emphasized in the prior April analysis, it should be noted that analyses of events five-plus years into the future, utilizing data that is two to six years old, introduces greater uncertainty than analyses of more proximate events for which current data may be available. The methodological approach used in this analysis involves considerable adjustment of two core wage data sources (2015 DOL Occupational Employment Survey data organized by industry and occupation and 2015 basis ACS Census data constructed from surveys between 2011 and 2015),² expected future inflation rates,³ assumptions of constant labor market conditions, analysis of participation in federal and state transfer payment programs affecting many minimum wage earners, and adjustment of the economic impact model baseline to 2018.⁴

Adding to this variability, the highest proposed wage change level of \$15.00 in 2022 would be well above the historical experience of the minimum wage in Vermont or any other U.S. state or any nation.⁵ Although other states have enacted future wage changes of this magnitude and relative level, none are effective to date and none have been conclusively studied.⁶ As a result of this, impact estimates for this variant are based on projections that are accordingly uncertain. Although the percent change in the real minimum wage between 2018 and 2022 for this variant would be 29% (43% nominal), the growth between 2014, when a series of minimum wage changes exceeding inflation rates began, and 2022, would be more than 45% (72% nominal) - well above any prior comparable period studied.

The other two variants analyzed herein represent less aggressive minimum wage growth, but are still at the high end of enacted future minimum wage levels by other U.S. states. Even the lowest variant considered, at \$12.50 in 2021, would represent the fourth highest general minimum wage in the U.S., tied with upstate NY, close to parts of Oregon's non-urban wage (\$11.50 - \$12.75), and only below those enacted in Washington (\$13.50 + inflation), California (\$14.00 for smaller firms and \$15.00 for larger firms), and the District of Columbia (\$15.00). Future minimum wage changes enacted in these and other states are detailed in prior Committee testimony.⁷

The minimum wage increase to \$12.50 in 2021 represents a constant dollar 10% increase (19% nominal) over the 2018 level, and a 24% increase since 2014 (43% nominal). The percentage differential with the U.S., and most importantly, the New Hampshire, minimum wage, if unchanged over this period, would rise from 38% today to 72% in 2021. As shown on the chart on the following page, New Hampshire differentials with the \$13.25 minimum wage would reach 83% in 2022 and exceed 100% in the same year for the \$15.00 variant.

As illustrated in the chart on page 4, on a constant dollar basis, the proposed \$12.50 in 2021 change would be only 1.8% below the highest real minimum wage on record, reached in

² American Community Survey (ACS) data utilized by Deb Brighton in estimating State and Federal social assistance program impacts, which we used as inputs to this analysis, are based on pooled data from 2011 to 2015, the Occupational Employment Survey data used to estimate jobs by wage category are based on adjusted semi-annual panel data from 2012 to 2015.

³ Based on JFO and Administration Consensus Economic Forecasts from December 2016.

⁴ The current Regional Economic Models, Inc. (REMI) model used in this analysis utilizes actual data through 2014. Because Vermont enacted three minimum wage increases above rate of inflation between 2014 and 2018, we updated the model with actual 2015 employment data and adjusted the baseline model to reflect minimum wage changes between 2015 and 2018.

⁵ Based on Purchasing Power Parity basis in constant 2015 U.S. Dollars, as reported by the OECD as of 2016.

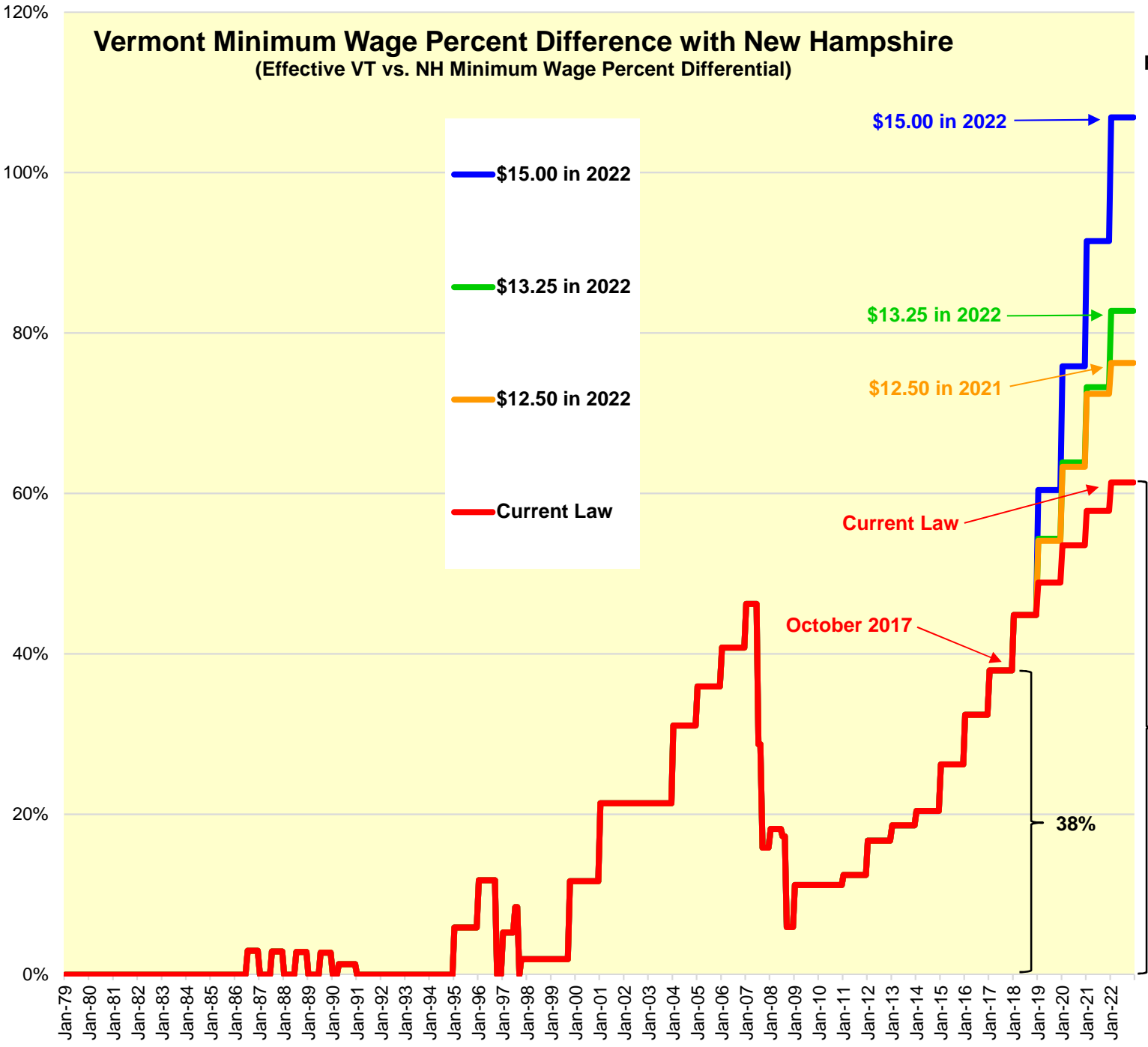
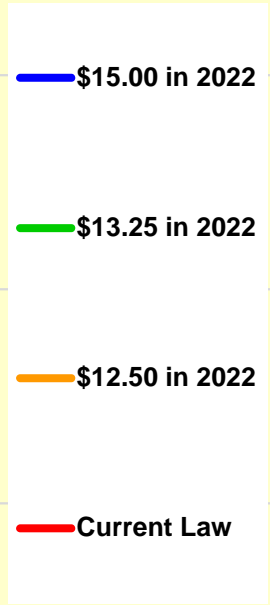
⁶ Initial studies of Seattle's \$13 minimum wage have been the highest analyzed to date. These studies have been presented separately to the Committee by the Joint Fiscal Office and have produced conflicting opinions on the impacts studied thus far. There are many differences between city-level wage mandates and state-level minimum wages, as well as differing prevailing wages in large urban areas vs. small rural states such as Vermont, and the availability of relevant data with which to measure economic and employment impacts.

⁷ See: "Supporting Documents," listed at: http://www.leg.state.vt.us/jfo/min_wage_study.aspx

Vermont Minimum Wage Percent Difference with New Hampshire

(Effective VT vs. NH Minimum Wage Percent Differential)

Percent Differential



\$15.00 in 2022

\$13.25 in 2022

\$12.50 in 2021

Current Law

October 2017

38%

61%

76%

83%

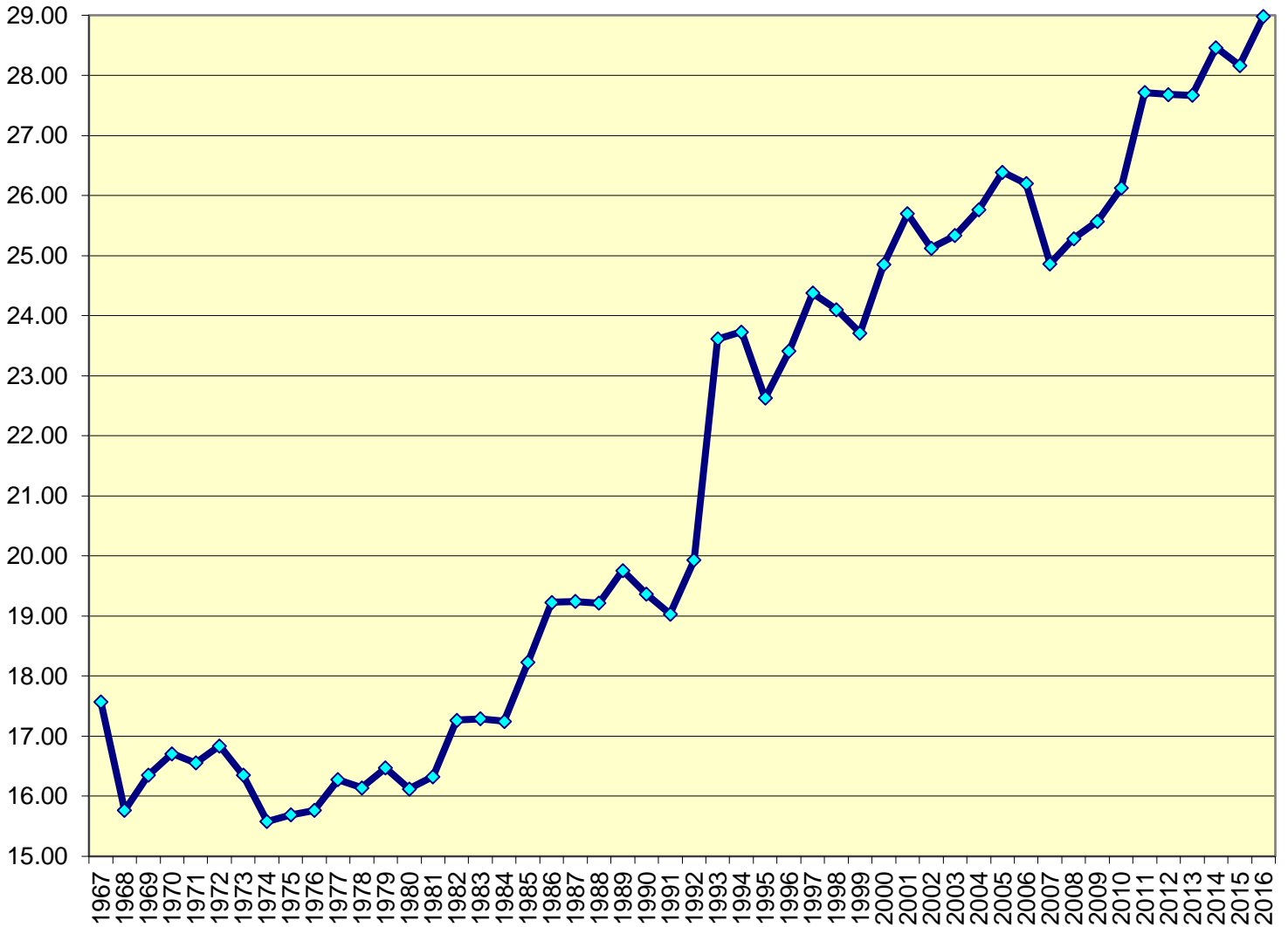
107%

February of 1968. The \$13.25 wage would be about 2% above this, while the \$15.00 minimum would be 16% above the highest prior real historical rate.

BACKGROUND

Economic inequality in the U.S. and every state in the union has been worsening since the early 1980's by almost every relevant measure. The globalization of commerce, technological change and tax policy choices, have all contributed to a widening gap between the richest in our society and those with the least. The average annual household income of the poorest 20% of the population totaled only \$12,943 in 2016, less than that earned in 1989, some 27 years ago. Over this same period, those in the highest quintile experienced real income growth of 34%, while those in the top 5% saw 45% growth. In 2016, the average annual income of the top 5% of U.S. households reached a new high at \$375,088, a record 29 times that of the average income of the lowest 20% of households in 2016, continuing an ever-widening four decade trend.

Ratio of Average U.S. Household Income of Top 5% to Lowest 20%
(Source: U.S. Census Bureau)

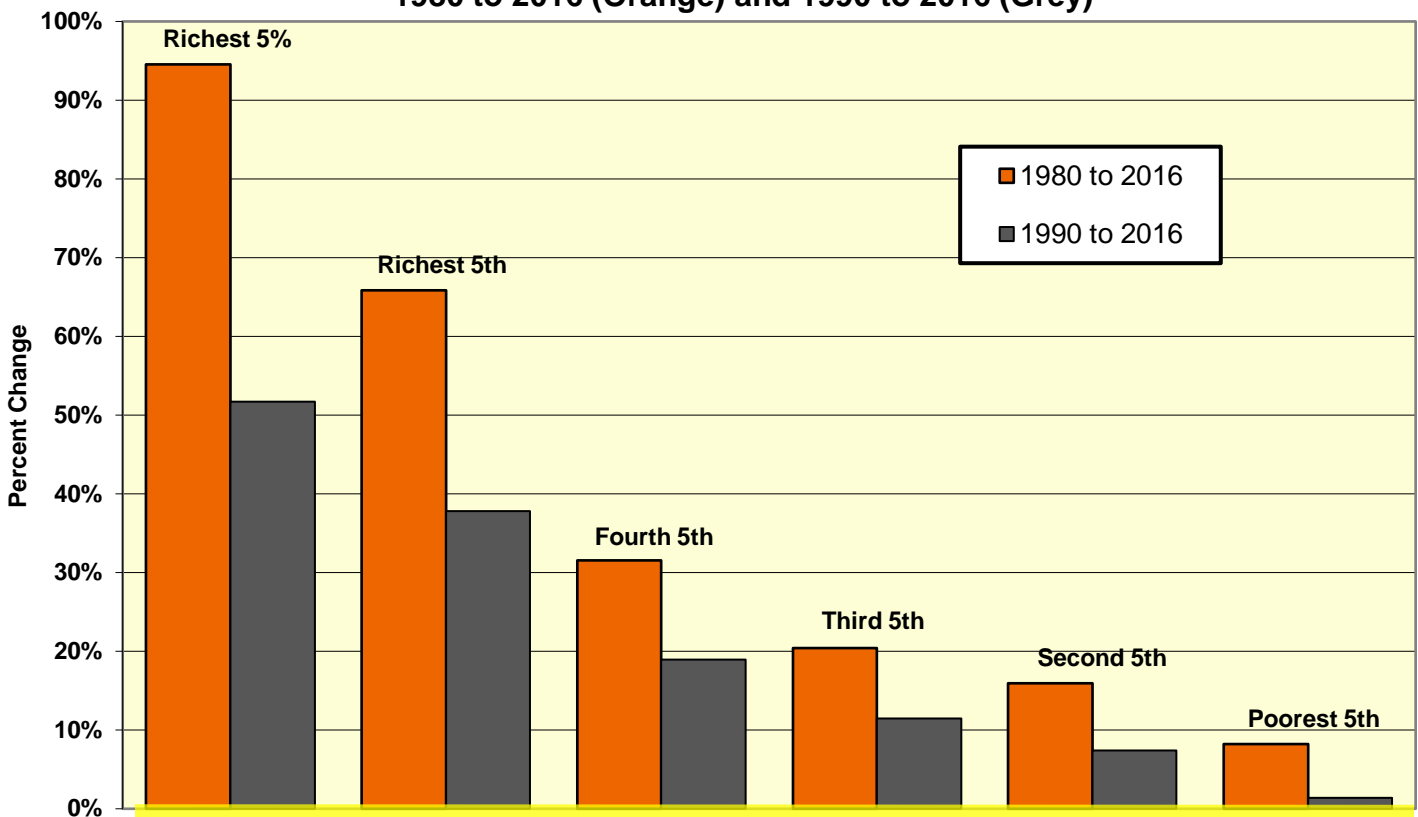


A recent state-level study found that, "in 24 states, the top 1 percent [by income] captured at least half of all income growth between 2009 and 2013, and in 15 of those states, the top 1

percent captured all income growth. In another 10 states, top 1 percent incomes grew in the double digits, while bottom 99 percent incomes fell.”⁸ According to the same study, in Vermont, the top 1% grew at a rate almost double that of the bottom 99%, but only captured about 23% of the total income growth during this period. For the United States overall, the top 1 percent captured 85.1 percent of total income growth between 2009 and 2013. In 2013, the top 1 percent of families nationally made 25.3 times as much as the bottom 99 percent. In Vermont, this ratio was 16.1, the ninth lowest in the country (see chart on following page).

The below chart shows the variation in real household income growth between 2016 and both 1980 and 1990. There is a consistent correlation between income level and real growth over the past 40 years, leading to some of the highest levels of inequality since the early 1900’s.

**Growth In Real U.S. Household Income, By Income Class
1980 to 2016 (Orange) and 1990 to 2016 (Grey)**



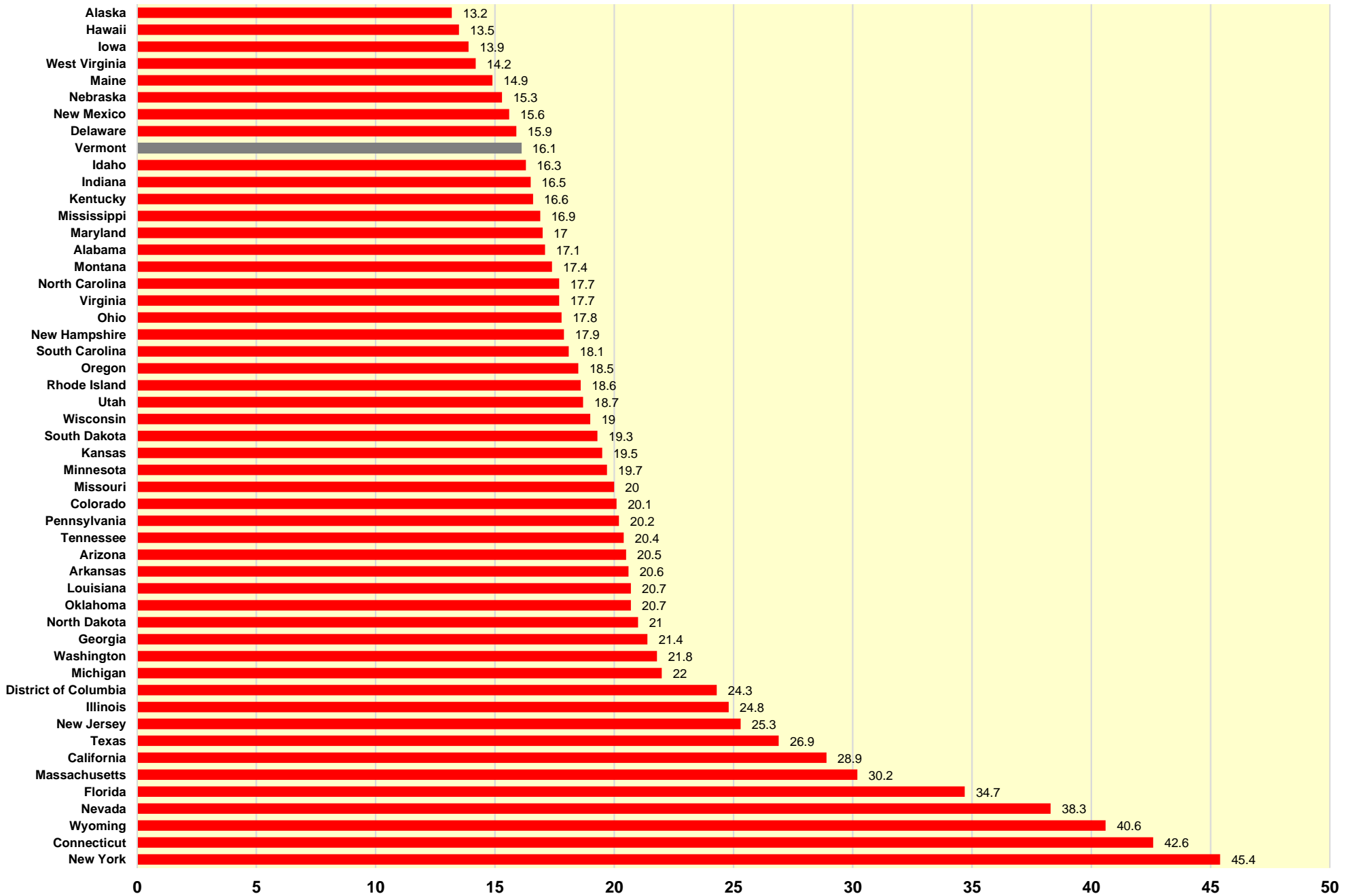
Source: U.S. Census Bureau

As disparate as income growth has been, wealth ownership, and growth in wealth, has been even more unequal. Analysis by the Congressional Budget Office⁹ showed that the wealth of families in the 90th percentile of the distribution grew 54% between 1989 and 2013, while that of the median grew 4% and that at the 25th percentile declined by 6%. The share of total wealth held by the top 10% increased from 67% to 76% during this same period, while the wealth owned by the bottom 50% dropped from 3% to 1%. The top 1% currently owns more than 35% of all U.S. wealth. On a global level, the richest eight men in the world, six of whom

⁸ See: <http://www.epi.org/publication/income-inequality-in-the-us/>

⁹ See: <https://www.cbo.gov/publication/51846>

Ratio of Annual Income of Top 1% to Bottom 99% by State - 2013



Top 1% Multiple of Bottom 99%

Source: Economic Policy Institute analysis of state-level tax data from Sommeiller (2006) extended to 2013 using state-level data from the Internal Revenue Service SOI Tax Stats (various years), and Piketty and Saez (2012)

are Americans, own as much wealth as the poorest 50% (comprising 3.6 billion people).¹⁰ New data from the triennial Federal Reserve Survey of Consumer Finance has just been released and will provide updated U.S. wealth, debt and income distribution data for 2016 when fully processed.

ECONOMIC IMPACTS OF RAISING THE MINIMUM WAGE

Few subjects in the economics profession have been more studied than minimum wage changes. Despite this, few generate as much divergence in professional opinion as expected impacts and policy efficacy associated with such changes.

While the theoretical economic principle underlying most minimum wage analysis is not contested – that raising the price of an input to production, such as labor, will reduce the demand for the input - observed “real world” impacts reveal complications to the theory that have yet to be fully measured and understood. In most of the minimum wage studies performed to date, the expected reduction in demand for labor has either been non-existent or of relatively small magnitude.¹¹ There are many possible reasons for this, including employer responses such as reducing employee hours, reducing benefits, reducing training, wage compression (paying new higher wage workers less), price increases and reduced profit margins – all of which could absorb increased labor costs without reducing job counts – as well as other effects, such as reduced employee turnover, efficiency wage responses from workers, increases in aggregate demand and changes in employment composition.

One of the most important reasons that studies to date have not found significant disemployment effects, however, is that virtually all of the minimum wage changes analyzed have been relatively “modest.” The real U.S. minimum wage declined more than 37% from 1968 to 1995 and has ranged from about \$6.00 to \$8.00 per hour in 2017 dollars for most of the period from 1984 to the present. For much of this period, it has been below 35% of the average hourly wage of all production and non-supervisory workers and has been below the federal poverty level for a family of two (assuming full-time, year-round work) for almost all of the past 35 years. Even the Vermont minimum wage had been below the federal poverty level for a family of three for the past 25 years, until exceeding it in January of this year. Despite large percentage changes in the minimum wage at times by the federal government and various states, the rates have generally lagged prevailing wage rates and productivity growth, and have affected relatively small shares of the workforce and total wages.

¹⁰ According to a study by Oxfam, at: <https://www.oxfam.org/en/research/economy-99>

¹¹ See, most prominently, Card, David and Alan Krueger. 1994. "Minimum Wages and Employment: A Case Study of the Fast-Food Industry in New Jersey and Pennsylvania." *American Economic Review*, vol. 48, no. 4, pp. 772-793; Card, David and Alan Krueger. 1995. *Myth and Measurement: The New Economics of the Minimum Wage*. Princeton, NJ: Princeton University Press; Dube, Arindrajit, T. William Lester, and Michael Reich. 2010. "Minimum Wage Effects Across State Borders: Estimates Using Contiguous Counties." *Review of Economics and Statistics*, vol. 92, no. 4, pp. 945-964; Dube, Arindrajit, T. William Lester, and Michael Reich. 2012. "Minimum Wage Shocks, Employment Flows and Labor Market Frictions." Berkeley, CA: Institute for Research on Labor and Employment. <http://escholarship.org/uc/item/76p927ks>; And, contesting these analyses, most prominently, Neumark, David and William Wascher. 2006. "Minimum Wages and Employment: A Review of Evidence from the New Minimum Wage Research." National Bureau of Economic Research Working Paper 12663. Cambridge, MA: National Bureau of Economic Research. <http://www.nber.org/papers/w12663>; Neumark, David and William Wascher. 2008. *Minimum Wages*. Cambridge, MA: The MIT Press; Sabia, Joseph J., Richard V. Burkhauser, and Benjamin Hansen. 2012. "Are the Effects of Minimum Wage Increases Always Small? New Evidence from a Case Study of New York State." *Industrial and Labor Relations Review*, vol. 65, no. 2, pp. 350-376; Hoffman, Saul D. and Diane M. Trace. 2009. "NJ and PA Once Again: What Happened to Employment When the PA-NJ Minimum Wage Differential Disappeared?" *Eastern Economic Journal* 35 (1): 115-128; and, Lordan and Neumark. August 2017, "People Versus Machines: The Impact of Minimum Wages on Automatable Jobs" NBER Working paper 23667, Cambridge, MA.

As a result of this, studies on minimum wage impacts have revealed correspondingly minor changes in employment, even among the groups most likely to be affected (poorly educated, younger, lowest wage and female workers). Most economists who point to the disconnect between minimum wage and employment changes are careful to limit their conclusions to “modest”¹² or “reasonable”¹³ changes in the minimum wage. Few, however, have attempted to define the level at which a minimum wage change would become “immodest.” Jared Bernstein, a senior fellow at the Center on Budget and Policy Priorities and chief economist to former Vice President Biden, has suggested that “moderate” minimum wage increases are those that include “not much more than 10 percent of the workforce in their sweep.” David Card, who was the first to demonstrate that small changes in a state’s minimum wage may have little or no employment effects, stated in a 2006 interview with Douglas Clement of the Minneapolis Fed, that his research “doesn’t mean that if we raised the minimum wage to \$20 an hour [about \$25/hour in 2017 dollars] we wouldn’t have massive problems.”¹⁴

As noted above, a Vermont minimum wage change to \$12.50 per hour in 2021 would represent an increase in the current 2017 minimum wage of about 12% in real dollars (25% in current dollars), affect about 15% of the labor force and add about 0.5% to the total wage bill. An increase to \$13.25 in 2021 would represent a real 17% increase above 2017 levels, affect 17% of the labor force and increase total wage payments by 0.8%.

A \$15.00 minimum wage in 2022 would represent a constant dollar increase of 32% above the 2017 wage rate and affect more than 25% of the labor force. None of the source studies that found little or no employment effects considered an increase of this level or magnitude. An increase to \$15.00 would thus be correspondingly uncertain in its impacts.

In order to help quantify ranges of possible economic impacts, we utilized a Vermont State model from Regional Economic Models, Inc. (REMI), as was done in several prior legislative studies. The REMI model represents a standard theoretical economic framework for estimating economic impacts.¹⁵ As such, it does not fully account for the recent observed effects of low level minimum wage changes. Working with REMI economists, we specified the model to account for these realities and other fiscal effects¹⁶, including:

- 1) The change in the wage bill by industry, based on DOL hourly wage data, hours worked and estimates of wage spillover effects
- 2) The change in production costs by industry

¹² For example, in a widely cited 2013 paper by John Schmitt of the Center on Economic and Policy Research, he states: “This is one of the most studied topics in economics, and the evidence is clear: modest minimum wage increases don’t have much impact on employment...” For the full report, see: <http://www.cepr.net/documents/publications/min-wage-2013-02.pdf>

¹³ Laura D’Andrea Tyson, former Chair of the Council of Economic Advisors under President Clinton and an economics professor at the Haas School of Business at the University of California, “finds no significant effects on employment when the minimum wage increases in reasonable increments.” See: <http://economix.blogs.nytimes.com/2013/12/13/raising-the-minimum-wage-old-shibboleths-new-evidence/>

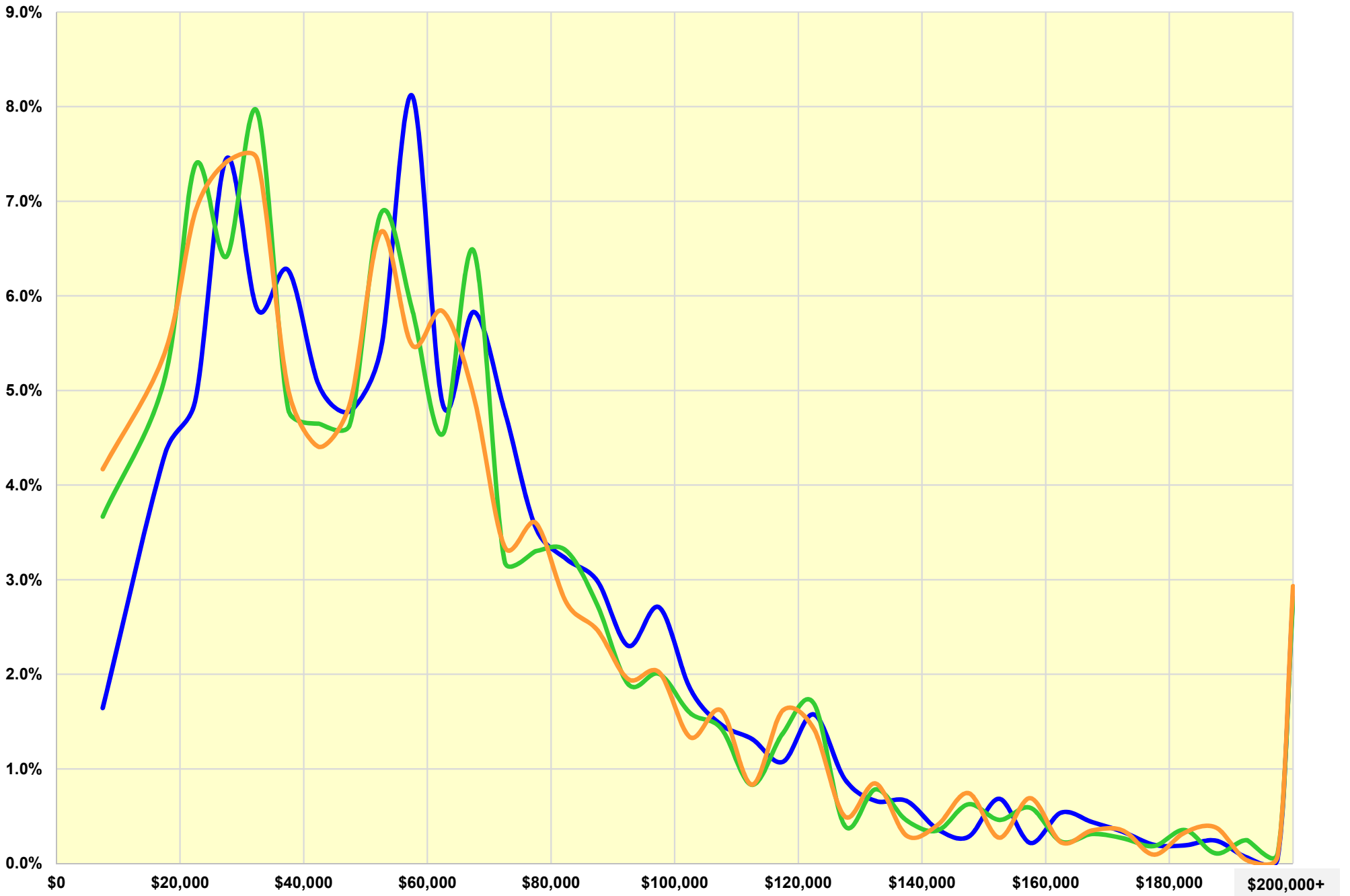
¹⁴ For the complete interview, see: http://www.minneapolisfed.org/publications_papers/pub_display.cfm?id=3190&

¹⁵ The REMI PI+ model v1.5 is more fully described at: <http://www.remi.com/resources/documentation> For further information regarding model equations, specifications and simulations, please contact the Vermont Joint Fiscal Office.

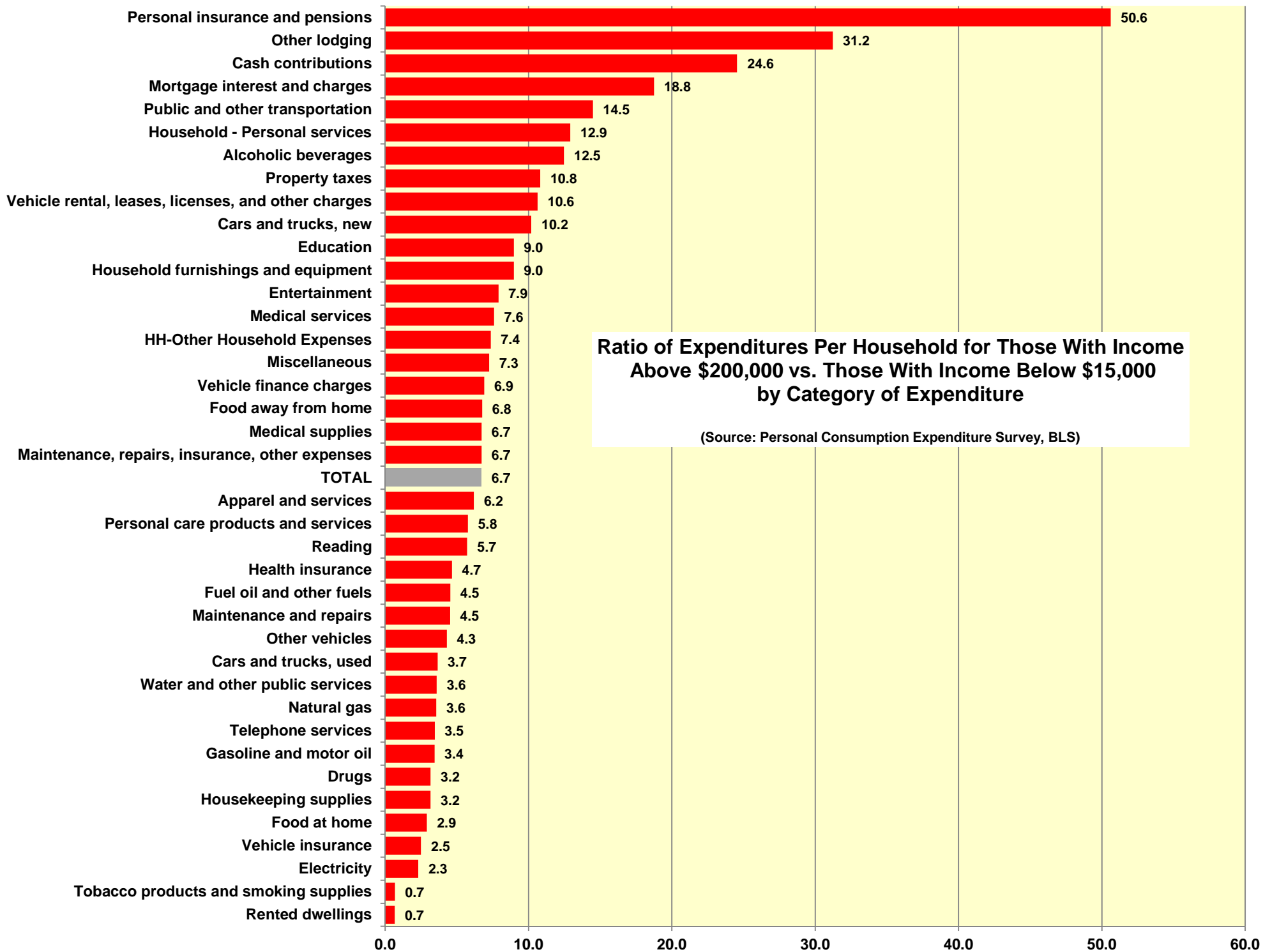
¹⁶ More detailed REMI model output, model constructs and model specification inputs are available from the Joint Fiscal Office upon request.

Percent of New Minimum Wage Income by Household Income Class

— \$15.00 in 2022 — \$13.25 in 2022 — \$12.50 in 2021



Total Household Income (2015 Dollars) - Source: Deb Brighton analysis based on pooled 2015 Census ACS data



Ratio of Expenditures Per Household for Those With Income Above \$200,000 vs. Those With Income Below \$15,000 by Category of Expenditure

(Source: Personal Consumption Expenditure Survey, BLS)

- 3) Adjustments to wage income and production cost offsets, including efficiency wage responses, lower turnover rates, wage compression, reduced benefits and higher marginal consumption propensities, due to the distribution of income gains among lower income households¹⁷
- 4) Incorporation of changes in enrollment in state and federal aid programs associated with wage income changes, including program expenditures and transfer payment changes

The economic effects of these changes included:

- 1) An increase in aggregate earned income of low wage workers and their families
- 2) A reduction in the number of hours worked and/or the elimination of some low wage jobs
- 3) A reduction in state benefit payments as growing low wage income disqualifies some from program participation
- 4) An increase in State tax payments as taxable income rises
- 5) A reduction in federal transfer payments into the State as growing low wage income disqualifies some from program participation, and
- 6) Increased federal tax revenue as taxable income rises

SUMMARY OF FINDINGS

- This analysis indicates that a \$12.50 minimum wage in 2021 would result in a long-term annual loss of about 900 jobs (or an equivalent reduction in hours), about 2.1% of total minimum wage payroll employment, and aggregate initial income gains to low wage workers of approximately \$55 million. As some of these workers transition away from State benefits and pay more in taxes, the net fiscal gain to the State will total about \$7 million. Additional federal income tax payments and the reduction in federal transfer payments in Medicaid, EITC, SNAP (3 Squares) and other payments to the State, however, could result in the loss of about \$17 million to the State in net federal fiscal changes.
- Impacts associated with a \$13.25 minimum wage in 2022 include job losses of about 1,240 jobs, about 2.4% of total minimum wage payroll employment, and aggregate initial income gains to low wage workers of about \$88 million. As some of these workers transition away from State benefits and pay more in taxes, the net fiscal gain to the State should total about \$8 million. The State's federal fiscal loss through higher taxes paid and reduced transfer payments associated with this wage variant are expected to total approximately \$27 million.
- Impacts associated with a \$15.00 minimum wage in 2022 indicate long-term average annual job losses of approximately 2,830 jobs, about 3.7% of total minimum wage payroll employment, and aggregate initial income gains to low wage workers of about \$240 million. As some of these workers transition away from State benefits and pay more in taxes, the net fiscal gain to the State should total about \$23 million. The State's federal fiscal loss through higher taxes paid and reduced transfer payments associated with this wage variant are expected to total approximately \$69 million.

¹⁷ It should be noted that limited empirical data exist with which to quantify all such effects, especially for proposed real minimum wage changes that are higher than those previously studied. In the absence of such data, we have used projections based on the low-end of ranges analyzed in the relevant literature.

TABLE 3 - Comparisons of Selected Metrics for Proposed Minimum Wage Changes

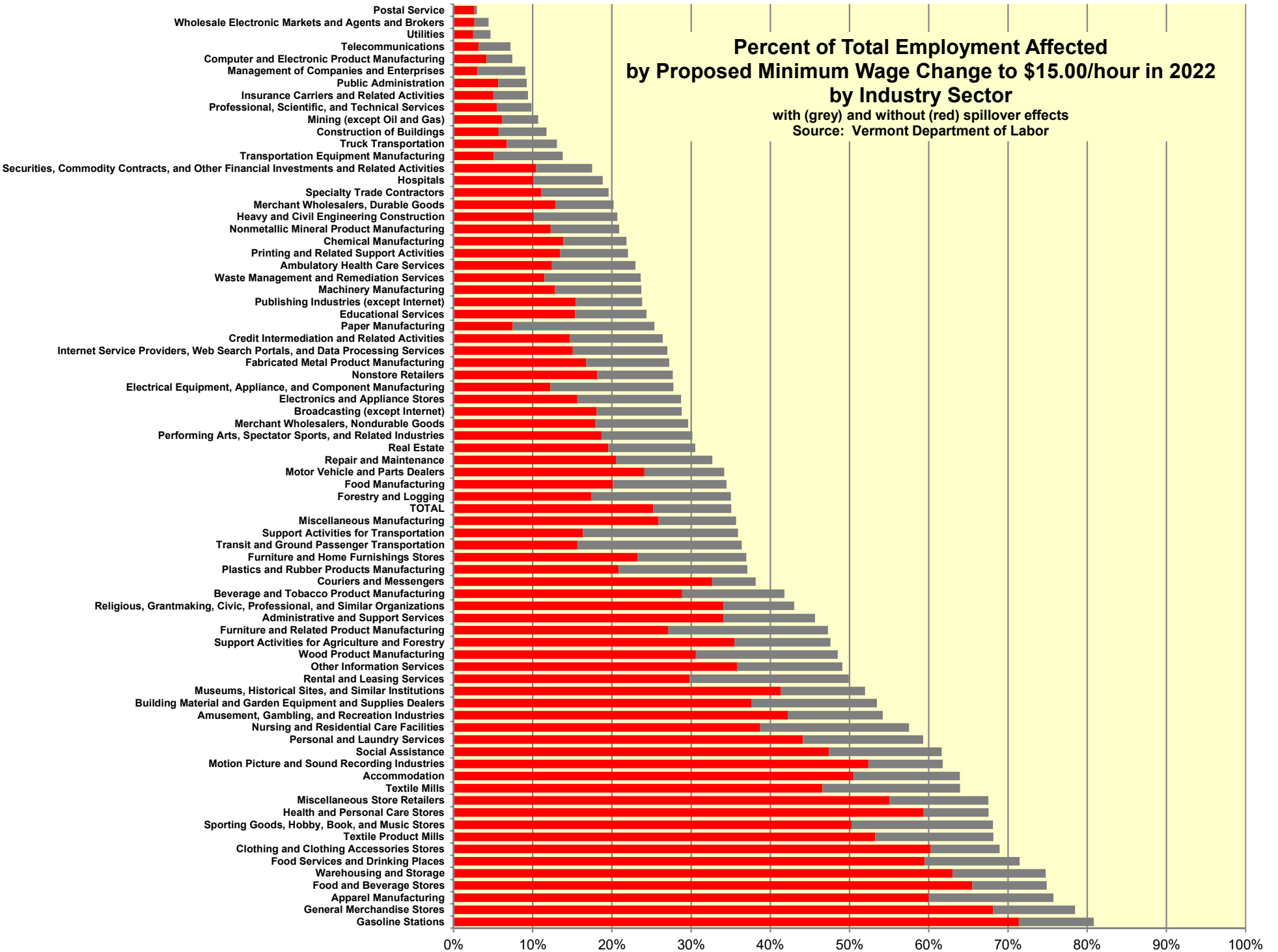
	\$15.00 in 2022 Variant 1	\$13.25 in 2022 Variant 2	\$12.50 in 2021 Variant 3
Number of Jobs Below Proposed Minimum Wage - DOL Basis	76,537	51,084	43,866
Share of Jobs Below Proposed Minimum Wage - DOL Basis	25.3%	16.9%	14.5%
Initial Wage Bill Change from 2018 Minimum to Proposed (\$2015M)*	\$240.6	\$87.6	\$55.0
Initial Wage Bill Change as a Share of Total Wages and Salaries	2.1%	0.8%	0.5%
Percent Change from 2018 Minimum - Nominal \$	43%	26%	19%
Percent Change from 2018 Minimum - Constant \$	29%	14%	10%
Percent Change from 2014 Minimum - Nominal \$	72%	52%	43%
Percent Change from 2014 Minimum - Constant \$	45%	28%	24%
Net Annual Long-Term Disemployment Impact**	2,830	1,237	903
Percent of Total Employment (REMI basis)	0.6%	0.3%	0.2%
Percent of Minimum Wage Jobs (DOL Basis)	3.7%	2.4%	2.1%
Net Fiscal Change - State Level	\$23.3	\$8.1	\$6.9
Net Fiscal Change - Federal Level (represents a net loss to VT)	\$68.9	\$26.5	\$17.4
Differential with U.S. and NH Minimum Wage, Assuming No Change***	107%	83%	72%
Proposed Real Minimum Wage Relative to Record High (Feb. 1968)	16%	2%	-2%

* In 2015 constant dollars, based on BLS data for the period 2019 to 2022 in Variants 1 and 2, and 2019 to 2021 in Variant 3; Including spillover effects; Excluding income changes from net job/hours-worked losses

** Based on REMI model runs, long-term annual average employment change relative to baseline, BEA/REMI basis, 2028-2040

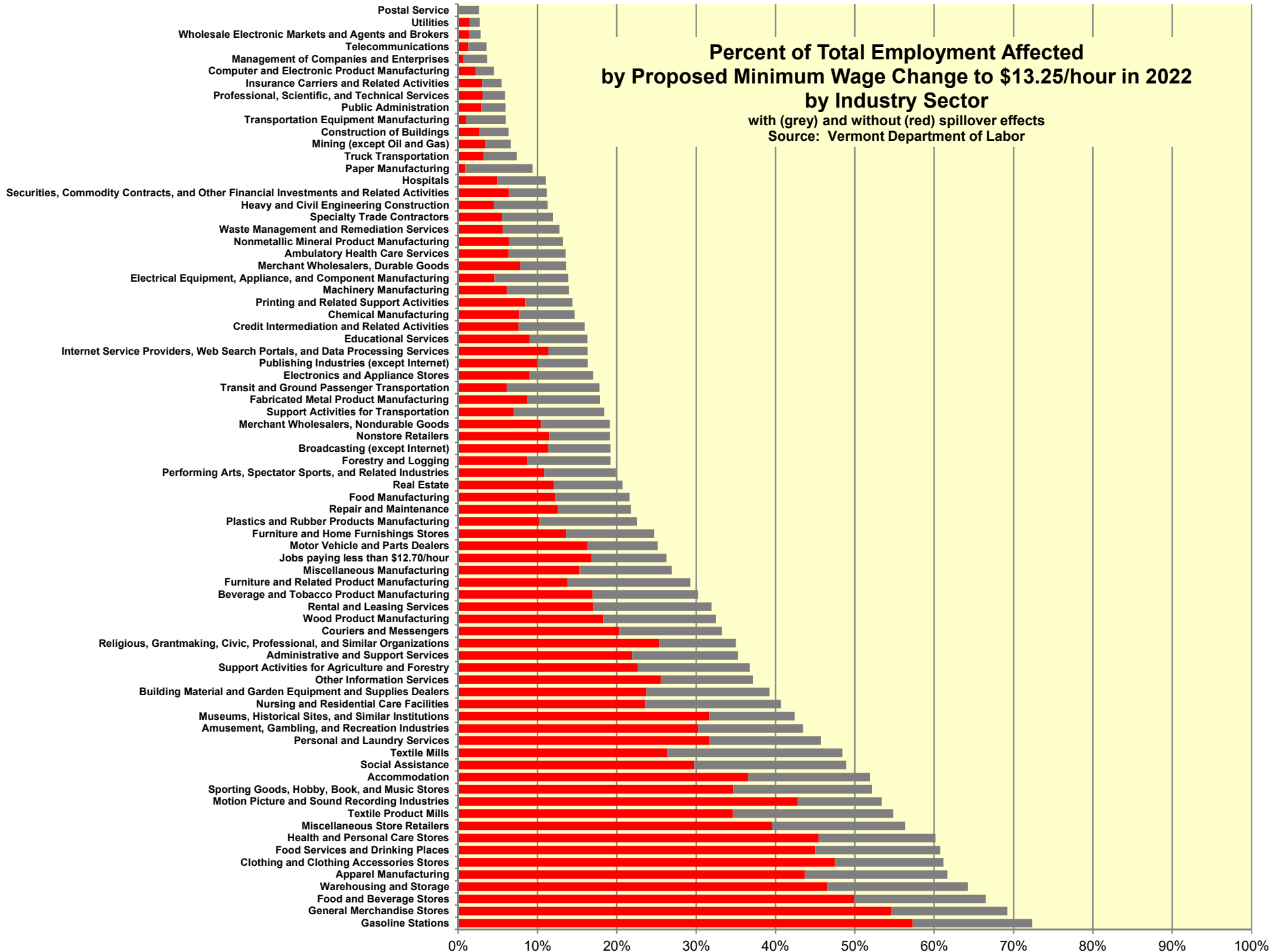
**** Based on a \$7.25 U.S. minimum wage and NH's current statutory link to the Federal minimum wage. The differential between VT and NH as of 2017 is 38%

- The industries most likely to be negatively affected are those with high out-of-state exports, high shares of affected workers (see charts on following pages), high absolute wage bill changes, and relatively high labor costs as a share of total production costs. Although firms with the highest export reliance are characterized by relatively highly paid workforces and capital intensive production processes, some still have 30% or more of their workforce that could be affected by the higher proposed minimum wage variants. In the manufacturing sector, these include furniture and wood product manufacturing, textile and apparel manufacturing and the large food product manufacturing sector.
- The largest employment losses, however, are likely to occur in the retail trade, food service and accommodation industries, where labor costs can account for 50% or more of total operating costs. These three sectors are expected to account for nearly half of the disemployment effects through reduced hours, labor substitution and job relocation or closure.
- It should be noted that even in some industries, typically considered to be less affected by external competition, such as retail sales, there would be effects associated with competition from both internet sales and border firms in New Hampshire, where the minimum wage differential with Vermont could grow to between 76% and 107% by 2022, the largest historical spread on record.



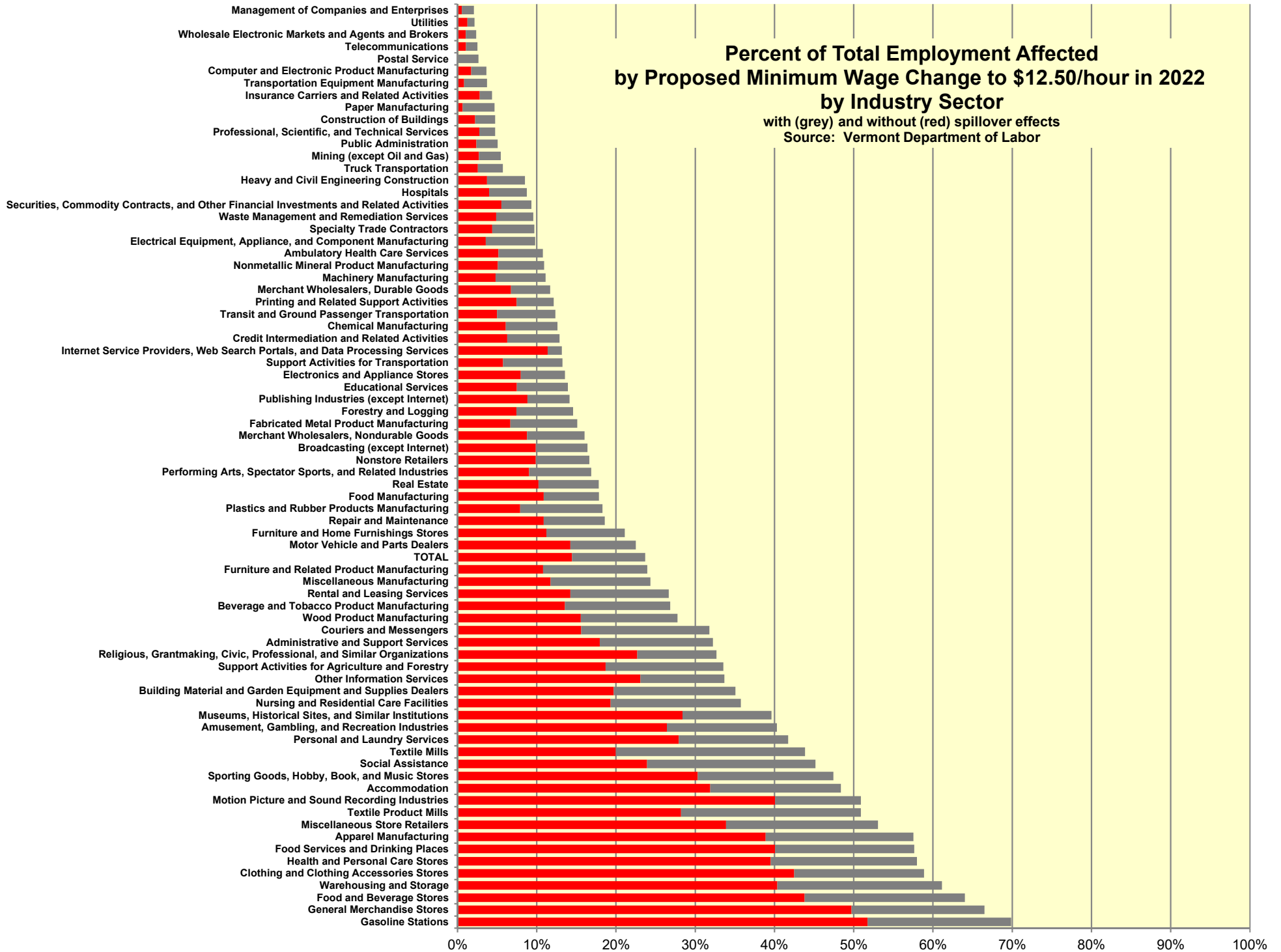
Percent of Total Employment Affected by Proposed Minimum Wage Change to \$13.25/hour in 2022 by Industry Sector

with (grey) and without (red) spillover effects
Source: Vermont Department of Labor



Percent of Total Employment Affected by Proposed Minimum Wage Change to \$12.50/hour in 2022 by Industry Sector

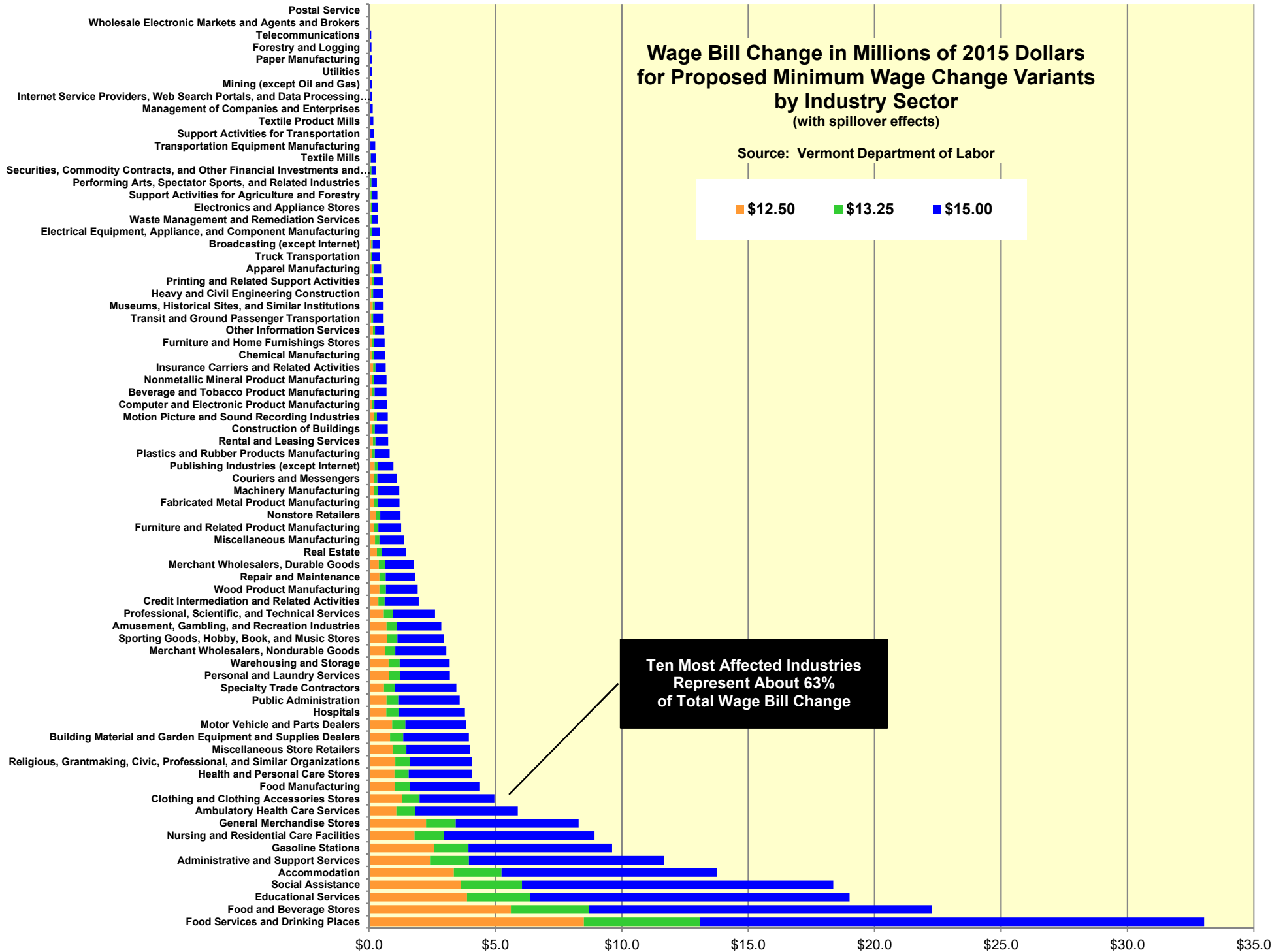
with (grey) and without (red) spillover effects
Source: Vermont Department of Labor



Wage Bill Change in Millions of 2015 Dollars for Proposed Minimum Wage Change Variants by Industry Sector (with spillover effects)

Source: Vermont Department of Labor

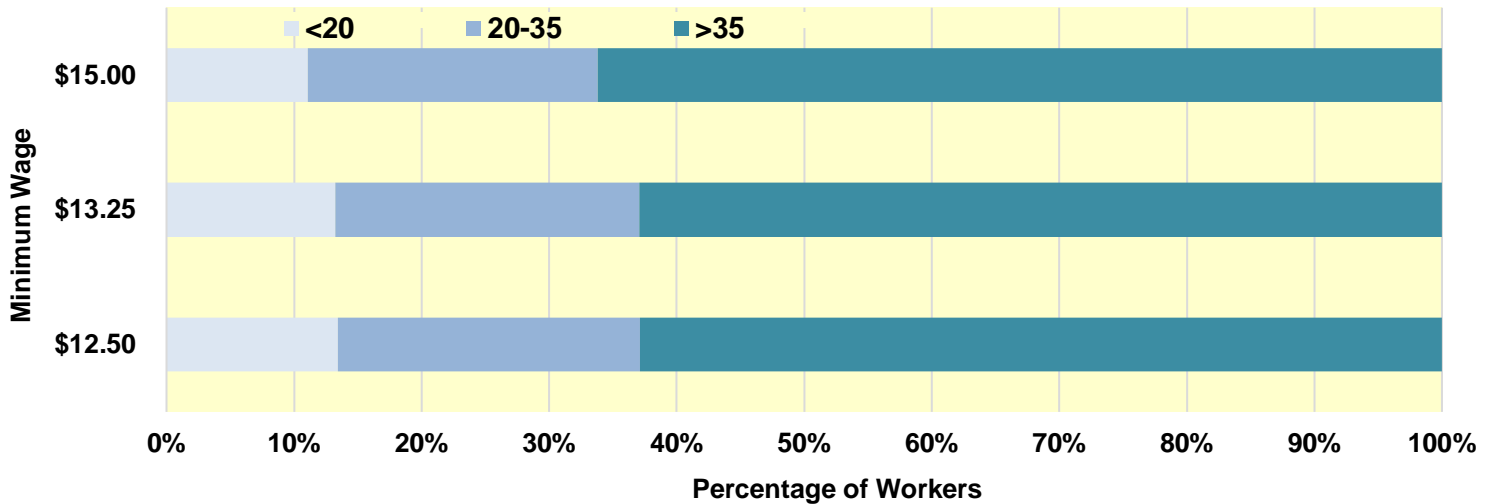
■ \$12.50
 ■ \$13.25
 ■ \$15.00



**Ten Most Affected Industries
Represent About 63%
of Total Wage Bill Change**

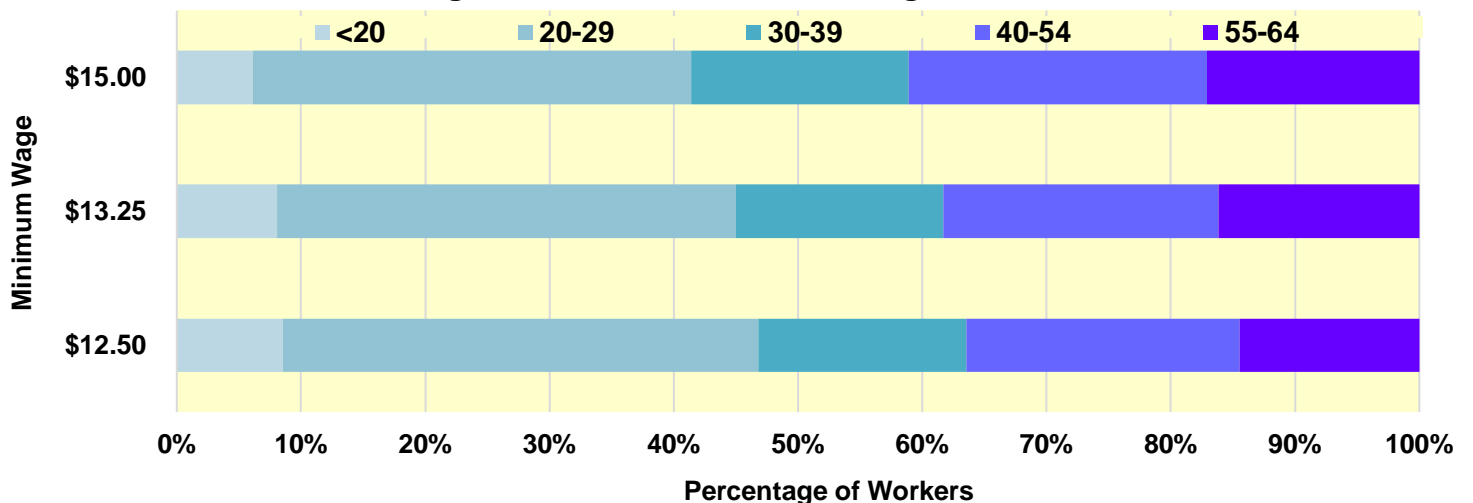
- This strongly suggests that collection of relevant analytic data and ongoing review and analysis of potential cross-border negative impacts could be important prior to and during the period from 2018 to 2022 and beyond. This could be initiated by reviewing existing data on the recent 15 year period of wage divergence between the two states, and developing data and analytic capacities to study this in greater depth.

Hours Worked per Week: Workers in Minimum Wage Workforce



- Of the workers expected to earn \$15/hour in 2022, 44% are male and 56%, female. The share of females is slightly higher at 45% in the lower two wage variants. Per the above chart, about two-thirds of all minimum wage workers are employed in full-time jobs, with slightly higher shares in the \$15/hour variant.¹⁸

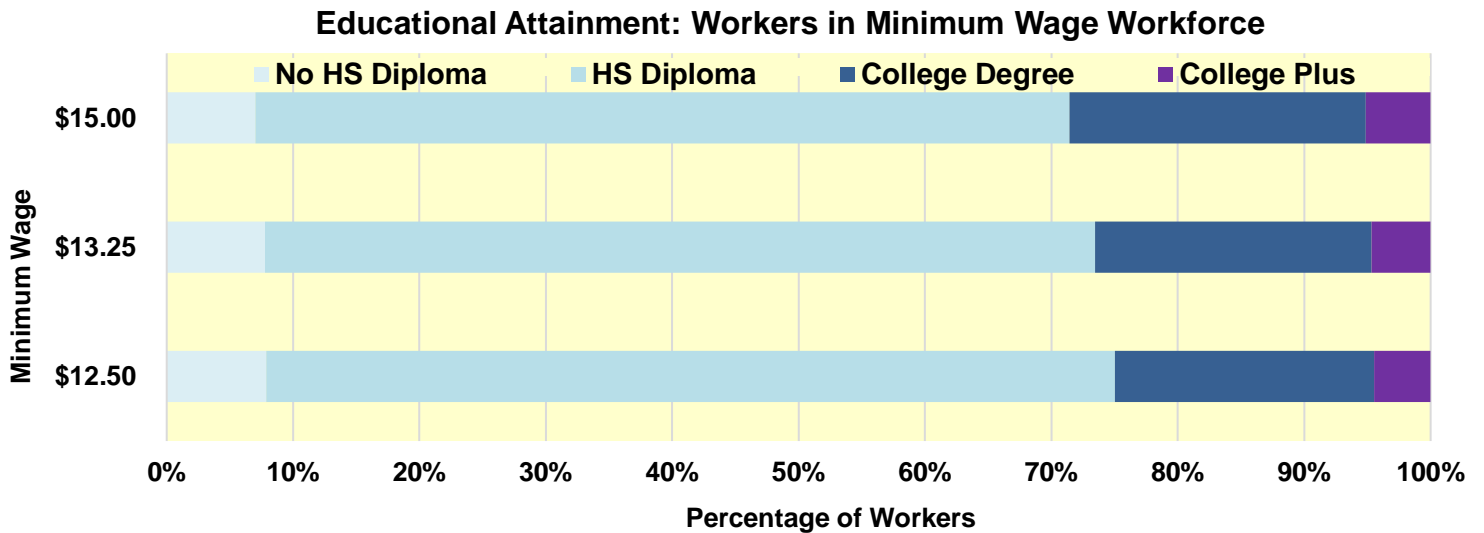
Age of Workers in Minimum Wage Workforce



- About 42% of all \$15/hour minimum wage workers are the head of a family (a couple or single parent family). 40% of these head-of-family minimum wage workers earn at least half of their family income. 59% of all \$15/hour minimum wage workers are over age 30, with a slightly younger age composition as the wage variant decreases.

¹⁸ Based on ACS data developed for the JFO by Deb Brighton.

- As minimum wage variants increase the minimum wage level, they affect a slightly higher proportion of workers who are older, have more advanced education, and work more hours.¹⁹
- While 48% of all female \$15/hour minimum wage workers are older than 40, only 32% of all male workers are older than 40. Conversely, among \$15/hour minimum wage workers, 49% of all male workers are under the age of 30, while only 36% of all female workers are younger than 30.²⁰
- Across all wage variants, women earning the minimum wage are more highly educated than men. Per the below chart, among all minimum wage workers, as would be expected, higher wage variants contain more highly educated workers than lower variants.



- Additional REMI model output and other details associated with this analysis are available from the Joint Fiscal Office upon request. The data and models developed as a part of this analysis will be available in the event that further Committee work on this issue is requested during the balance of the year.

¹⁹ Ibid.

²⁰ Ibid.



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Memorandum

To: Steve Klein, Chief Fiscal Officer, Joint Fiscal Office
From: Tom Kavet, Nic Rockler
CC: Sara Teachout, JFO
Date: April 30, 2017
Re: Proposed Five Year Minimum Wage Increase to \$15.00/hour in 2022

Background

As requested, we have performed a preliminary quantitative analysis of potential economic impacts associated with a slightly revised version of the proposed minimum wage increase to \$15.00/hour in 2022, previously reviewed during the session.¹ The current analysis consists of three minimum wage increases of \$1.00 each between 2019 and 2021 (to \$11.50, \$12.50 and \$13.50, respectively), and a \$1.50 increase in 2022 (to \$15.00). Overall impacts are reported for the entire period from 2018 (assuming a current law minimum wage in nominal dollars of \$10.50) to 2022.

It should be noted that analyses of events five-plus years into the future, utilizing data that is two to six years old, introduces greater uncertainty than analyses of more proximate events for which current data may be available. This analysis involves considerable adjustment of the core wage data used in the analysis (2015 basis, however, constructed from surveys between 2011 and 2015),² expected future inflation rates,³ assumptions of constant labor market conditions and adjustment of the economic impact model baseline to 2018.⁴

Adding to this variability, the proposed wage change level in 2022 will be well above the historical experience of the minimum wage in Vermont or any other U.S. state or any nation (see chart on following page).⁵ Although other states have enacted future wage changes of this magnitude and relative level, none are effective to date and none have been studied. As a result of this, impact estimates are based on projections that are accordingly uncertain. Although the percent change in the proposed real minimum wage between 2018 and 2022 would be 29% (43% nominal), the growth between 2014, when a series of minimum wage

¹ See JFO memo of February 8, 2017 on the same subject.

² American Community Survey (ACS) data utilized by Deb Brighton in estimating State and Federal social assistance program impacts, which we used as inputs to this analysis, are based on pooled data from 2011 to 2015, the Occupational Employment Survey data used to estimate jobs by wage category are based on adjusted semi-annual panel data from 2012 to 2015.

³ Based on JFO and Administration Consensus Economic Forecasts from December 2016.

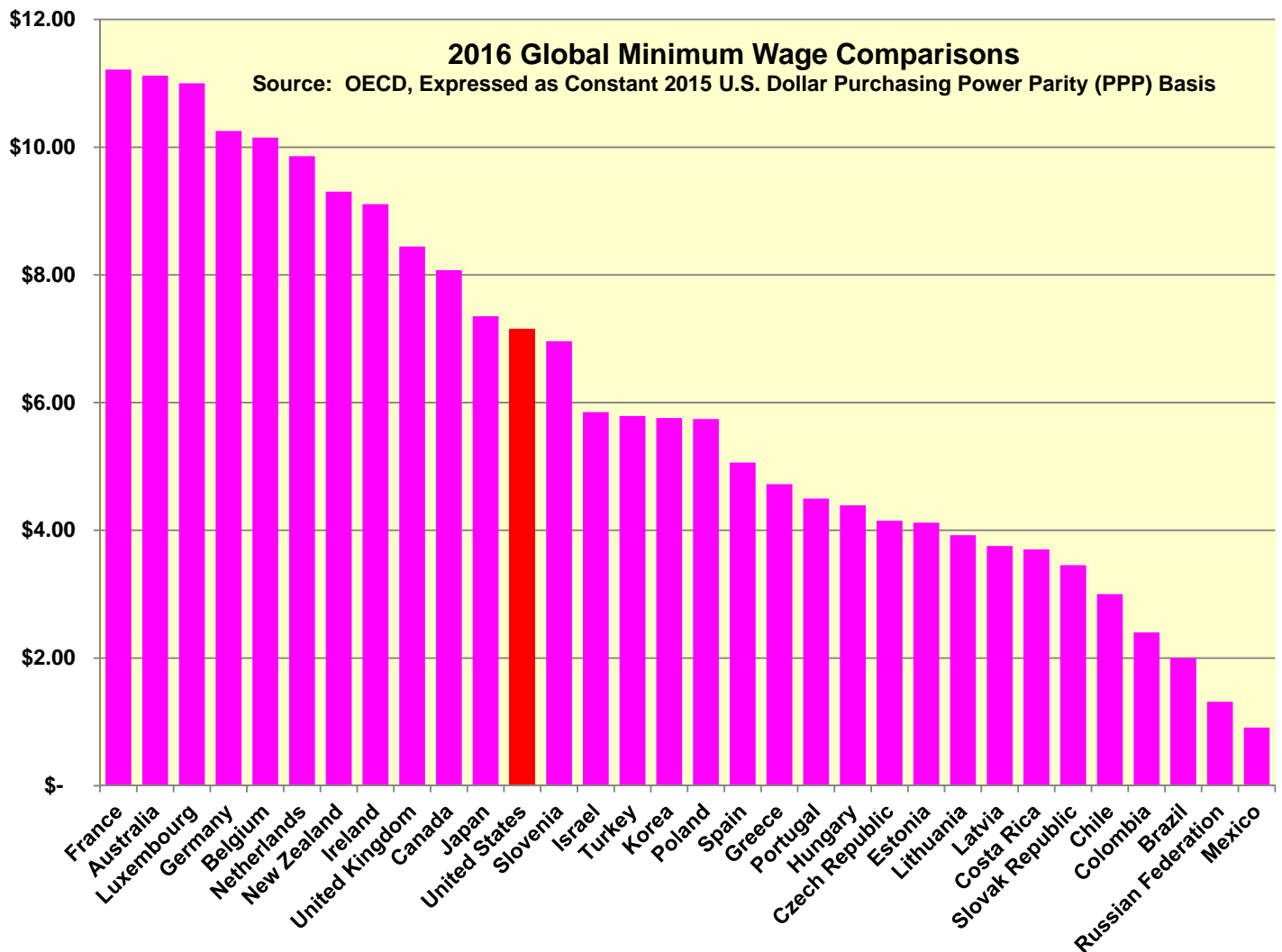
⁴ The current Regional Economic Models, Inc. (REMI) model used in this analysis utilizes actual data through 2014. Because Vermont enacted three minimum wage increases above rate of inflation between 2014 and 2018, we updated the model with actual 2015 employment data and adjusted the baseline model to reflect minimum wage changes between 2015 and 2018.

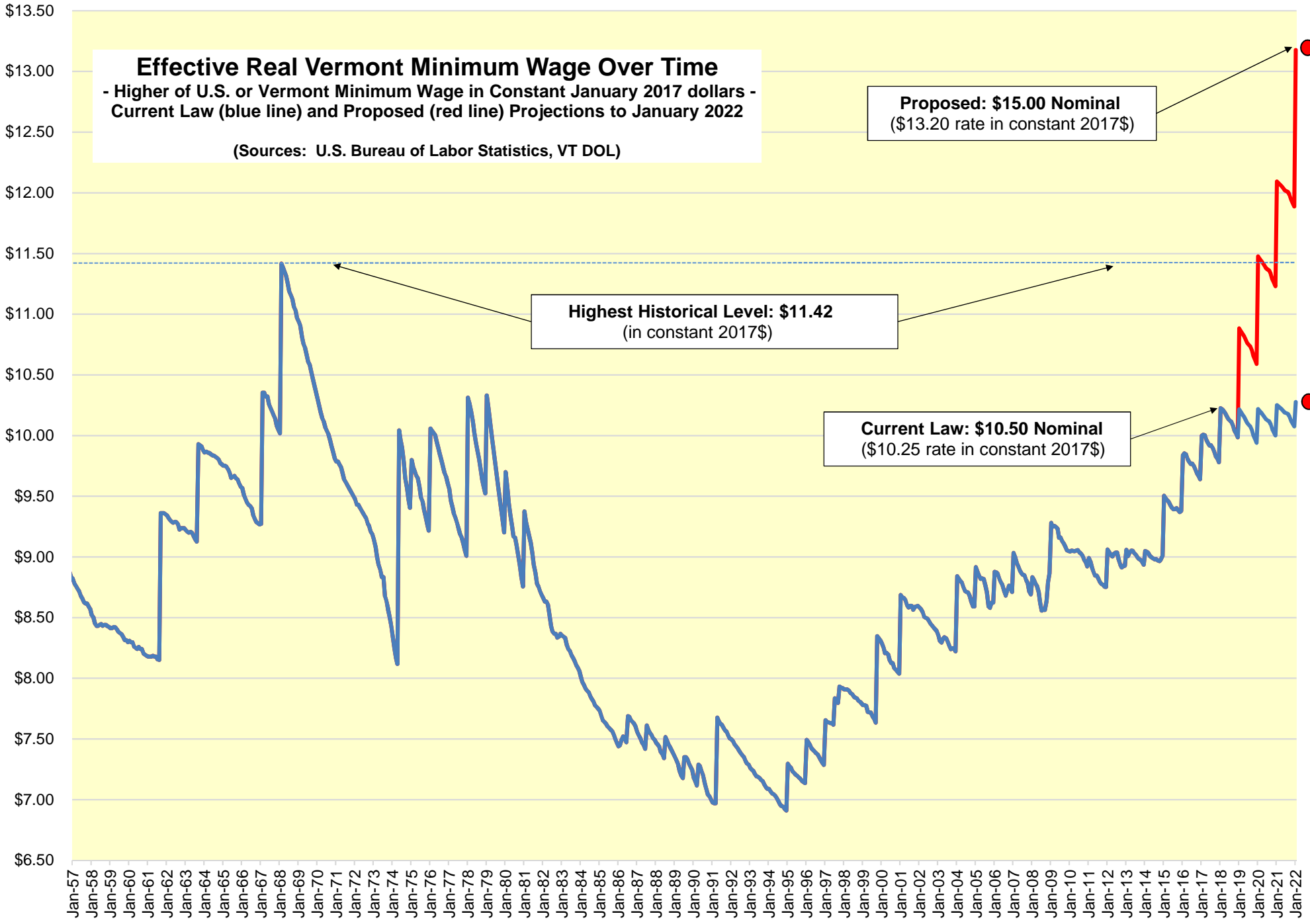
⁵ Based on Purchasing Power Parity basis in constant 2015 U.S. Dollars, as reported by the OECD as of 2016.

changes exceeding inflation rates began, and 2022, would be more than 45% (72% nominal) - well above any prior comparable period studied.

The chart on the following page depicts both the current law and proposed minimum wage in constant (inflation-adjusted) January 2017 dollars, to 2022, based on the most recent consensus forecasts of inflation. In 2017 constant dollars, the \$15.00/hour rate in 2022 would be about \$13.20. The current law level would otherwise be about \$10.25/hour (\$10.50 in 2018, adjusted for inflation each year) in 2017 dollars. Based on the proposed change, the minimum wage would exceed its prior all-time high (reached in February of 1968 at \$11.42/hour in 2017 dollars) in 2020 (at about \$11.47/hour) and every year thereafter (leveling off at a top real rate of \$13.20 in 2022 and beyond).

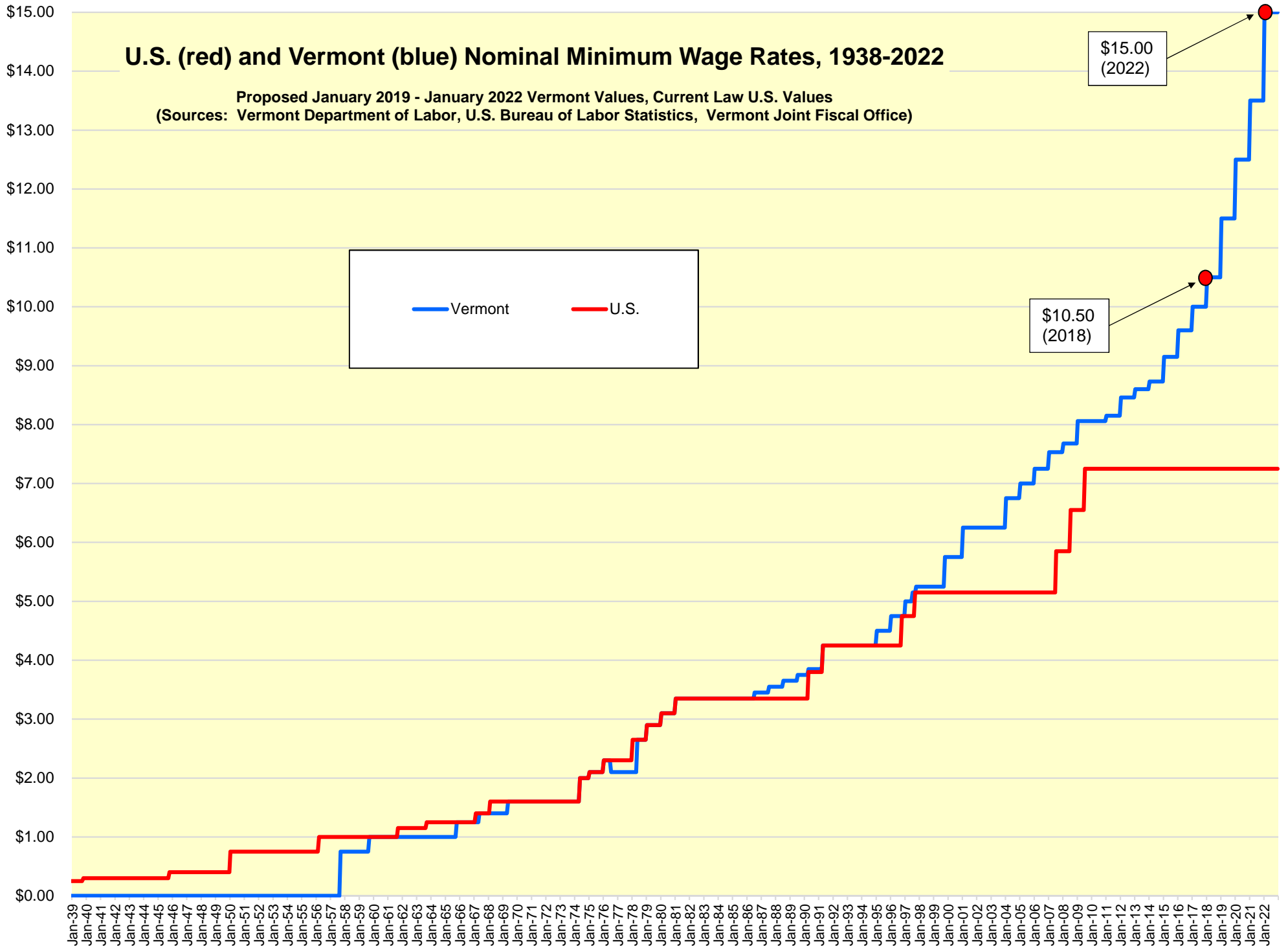
With respect to competitive relative wage conditions, a record 19 states raised their minimum wages in January of 2017, with Massachusetts and Washington raising theirs to \$11.00/hour, just below that of Washington, D.C. at \$11.50/hour, the highest in the nation. Vermont is tied for the sixth highest state rate with Arizona, at \$10.00/hour and the third highest in New England. Quebec's minimum wage in Canadian dollars is now \$10.50/hour, the lowest of any Canadian province, but will go up to \$11.25 CAD in May – the equivalent of about \$8.50 USD at current exchange rates.





U.S. (red) and Vermont (blue) Nominal Minimum Wage Rates, 1938-2022

Proposed January 2019 - January 2022 Vermont Values, Current Law U.S. Values
 (Sources: Vermont Department of Labor, U.S. Bureau of Labor Statistics, Vermont Joint Fiscal Office)



While many states have adopted automatic inflation indexing of their minimum wages, many have also now passed multi-year future wage increases, independent of inflation rates, such as that proposed in Vermont. California has passed a series of minimum wage increases that are almost identical to those proposed in Vermont (ending at \$15.00/hour in 2022). Only the District of Columbia has enacted a minimum wage increase that is higher (at \$15.00/hour two years earlier, in 2020).

States Enacting Phased-In and Future Minimum Wage Rates

State	Highest Future Rate	Year
District of Columbia	\$15.00	2020
California	\$15.00	2022
Washington	\$13.50	2020
Oregon	\$13.50	2022
New York	\$12.50	2021
Maine	\$12.00	2020
Colorado	\$12.00	2020
Arizona	\$12.00	2020
Vermont	\$10.50	2018
Maryland	\$10.10	2018
Hawaii	\$10.10	2018
Michigan	\$9.25	2018

As noted in the prior JFO analysis this year, the pronounced and growing minimum wage rate differential with New Hampshire and other states at or near the Federal minimum wage of \$7.25 represents a potential economic risk that further study could help assess.

Source data used in this analysis include Vermont Department of Labor estimates of employment by 10 cent increments from \$9.15 to \$14.00 per hour,⁶ by industry for the year, 2015. These data are based on BLS Occupation Employment Survey statistics. Although we regard these as the best available estimates currently available, many observations are estimated, and are not actual data points. We have been working with the Department to consider other analytic approaches that could improve these estimates and expect to have more accurate estimates for use with 2016 data (recently released) in the event further analysis is requested by the legislature over the summer in connection with this issue. These estimation techniques could also be used to extract comparable information for NH and other states for use in competitive analyses discussed in committee hearings during the current session.

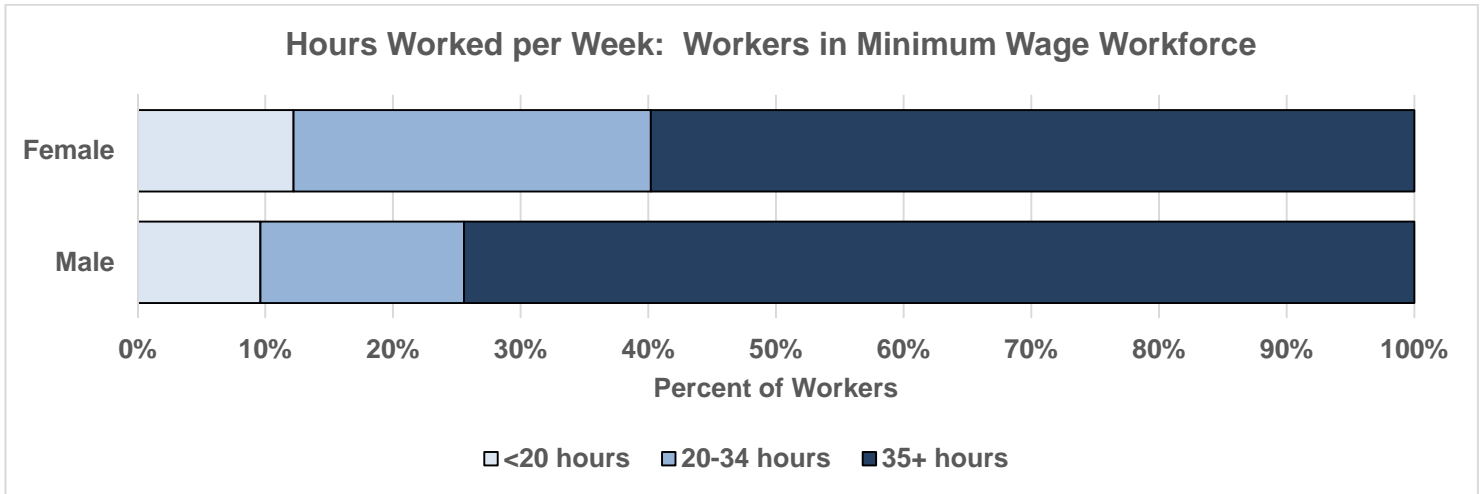
Summary of Findings to Date

- The share of the employed labor force in 2018 expected to be earning below the proposed \$15.00 per hour minimum wage in 2022 will exceed 25% of all jobs, with so-called “spillover” effects (wage increases above the new minimum wage given to workers just below and just above a new minimum wage, so as to preserve some

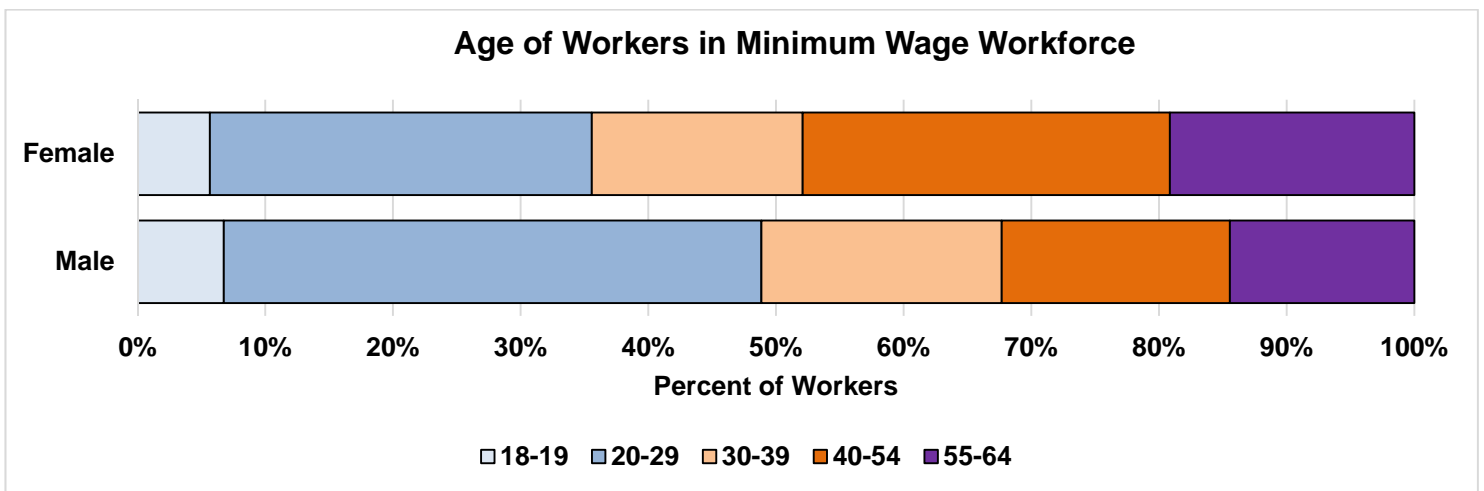
⁶ The first employment category provided was \$9.15 to \$9.20. The source file was extended from \$14.00 to \$14.60 using source OES data in order to accommodate higher wage “spillover” and “ripple” effects (wage changes given to workers just below and just above a new minimum wage, so as to preserve some pay hierarchy among existing workers).

compensation hierarchy among existing workers), extending this to more than a third (35%) of all employment (see chart on page 8).

- Of the workers expected to earn \$15/hour in 2022, 44% are female and 56%, male. Per the below chart, two-thirds of all minimum wage workers are employed in full-time jobs.⁷



- 42% of all minimum wage workers are the head of a family (a couple or single parent family). 40% of these head-of-family minimum wage workers earn at least half of their family income. 59% of all minimum wage workers are over age 30. While 48% of all female minimum wage workers are older than 40, only 32% of all male workers are older than 40. Conversely, 49% of all male minimum wage workers are under the age of 30, while only 36% of all female minimum wage workers are younger than 30.⁸



- Academic literature that finds diminutive (or no) negative employment impacts from minimum wage changes, has largely been confined to studies in which the wage changes were relatively “modest” – sometimes described as affecting 10% or less of

⁷ Based on ACS data developed for the JFO by Deb Brighton.

⁸ Ibid.

those employed.⁹ As noted above, the proposed change would substantially exceed this threshold.

- By 2022, total income gains among affected workers will total more than \$240 million per year in 2015 dollars, providing powerful, positive local economic effects, including fiscal gains to the State in the form of higher income and other tax revenues and lower expenditures for social assistance programs totaling nearly \$20 million (see below table).
- These positive effects will be largely offset by negative cost of production increases, reduced federal transfer payments to the State, higher Federal income and payroll tax payments by Vermont businesses and workers, higher local prices and associated reductions in demand, reductions in employee benefits, and the longer-term substitution of capital for labor in the most highly affected industry sectors.

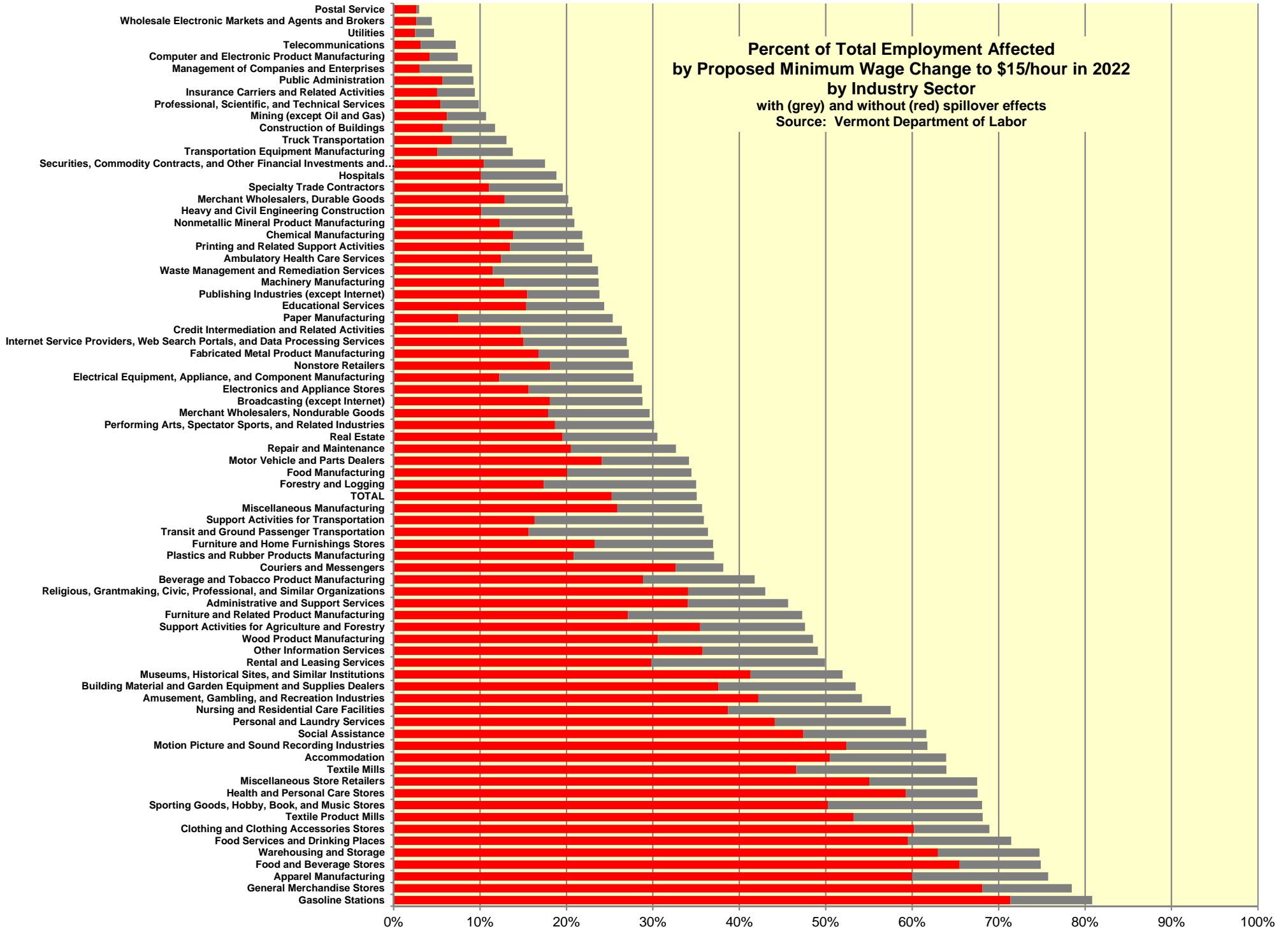
Federal and State Changes in Income Tax and Transfer Payments based on proposed 2022 \$15 minimum wage, relative to 2018 (Millions of 2015 dollars)			
Federal		State	
SNAP savings	\$8.2	Income Tax increase	\$8.0
Income Tax increase	\$26.0	HO Rebate savings	\$0.4
Payroll Tax employee	\$17.3	Renter Rebate savings	\$0.2
Payroll Tax employer	\$17.3	PTA savings	\$1.5
EITC savings	\$4.1	CCFAP savings*	\$0.0
Medicaid savings	\$21.0	VT EITC savings	\$1.3
Health Subsidy payments	-\$23.3	Medicaid	\$7.0
Child Medicaid/SCHIP	\$1.0	Premium + cost sharing payments	-\$1.3
		Doctor Dynasaur	\$1.4
		LIHEAP	\$0.9
TOTAL	\$71.8	TOTAL	\$19.5

*Assuming no decrease in CCFAP for families <185% FPL for LIHEAP and SNAP, and all for Section 8
Source: Deb Brighton analysis for JFO, prior to iterative job loss estimates

- Given the above caveats regarding the unprecedented nature of the proposed wage change, State economic impact model runs suggest net disemployment effects of about 1,500 jobs in 2022, rising to about 3,000 jobs per year in 2028 and beyond, less than 1% of total employment at that time and about 3% of those working at the new minimum wage. These effects are lower than comparable minimum wage increases previously analyzed, due to more comprehensive REMI modelling of transfer payment changes and Affordable Care Act low income healthcare subsidies totaling more than \$23 million that were not previously available to offset other healthcare-related transfer payment reductions from the federal government (see above table).

⁹ See JFO memo of March 13, 2014, pages 9-14, for a more complete description of these effects.

**Percent of Total Employment Affected
by Proposed Minimum Wage Change to \$15/hour in 2022
by Industry Sector
with (grey) and without (red) spillover effects
Source: Vermont Department of Labor**



- The industries most likely to be negatively affected are those with high out-of-state exports, high shares of affected workers (see chart on preceding page), and relatively high labor costs as a share of total production costs. Although firms with highest export reliance are characterized by relatively highly paid workforces and capital intensive production processes, some still have 30% or more of their workforce that could be affected by the proposed minimum wage change. In the manufacturing sector, these include furniture and wood product manufacturing, textile and apparel manufacturing and the large food product manufacturing sector.
- The largest employment losses, however, are likely to occur in the retail trade, food service and accommodation industries, where labor costs can account for 50% or more of total operating costs. These three sectors are expected to account for nearly half of the disemployment effects through reduced hours, labor substitution and job relocation or closure.
- It should be noted that even in some industries, typically considered to be less affected by external competition, such as retail sales, there would be effects associated with competition from both internet sales and border firms in New Hampshire, where the minimum wage could be less than half the Vermont rate by 2022, the largest historical spread on record. This suggests that collection of relevant data, ongoing review and analysis of potential cross-border negative impacts could be important prior to and during the period from 2018 to 2022.
- Related analysis performed for the JFO by Deb Brighton¹⁰ shows that earned income growth among some of the lowest income workers can result in state and federal public benefit reductions, substantially offsetting and in some cases completely negating improvements in net family income from minimum wage changes. These benefit reductions can eliminate incentives to work for many low-wage workers. A comprehensive analysis of benefit loss interactions with earned income gains would allow adjustment of public benefit programs wherever possible in order to preserve work incentives at all wage levels, especially those below a livable income.
- Potential reductions in federal transfer payments can generate substantial negative economic impacts, as earned income replaces federal aid. Specific program options could be explored with federal program administrators and Vermont's Congressional delegation so as to determine whether any redirection of reduced federal transfer payments may be possible.
- Federal (especially) and State income taxes consume a significant proportion of marginal income well below livable income levels. These high marginal tax rates in tandem with public benefit reductions diminish work incentives and delay achievement of a livable income. In tandem with potential minimum wage and benefit program changes, consideration should be given to a mix of State tax changes and benefit programs that can most efficiently maximize low wage workers' incomes and State revenues, minimize public benefit expenditures and preserve incentives to work.
- Additional REMI model output and other analytic details associated with this proposed minimum wage change are available from the Joint Fiscal Office. The data and models developed as a part of this analysis will be available in the event that further legislative work on this issue is mandated during the balance of the year.

¹⁰ http://www.leg.state.vt.us/jfo/issue_briefs_and_memos/Benefits%20and%20Min%20Wage%20DRAFT%20ESI%20032017.pdf