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Economic Effects of a New Jersey Minimum Wage Increase: An Econometric Scoring of SCR No. 1

This report analyzes the potential economic impact of implementing the changes to New Jersey minimum wage laws contained in Senate Concurrent Resolution (SCR) No. 1 on private sector employment and production. SCR No. 1, sponsored by Senators Stephen M. Sweeney and Shirley K. Turner along with Assembly Members Sheila Y. Oliver, Timothy J. Eustace, and L. Grace Spencer, would amend Article 1 of the New Jersey Constitution to include language stipulating an increase of the minimum wage in New Jersey to $8.25 per hour beginning the January 1 following the date of the amendment's passage (assumed to be January 1, 2014, for purposes of this analysis). The amendment would also provide for future increases in the New Jersey minimum wage by tying it to the consumer price index for all urban wage earners and clerical workers as calculated by the federal government. The long-run effect of the legislation would be the destruction of jobs and economic production in the state of New Jersey. Depending upon the rate of inflation in future years, passage of SCR No. 1 could result in over 31,000 lost jobs in New Jersey over a ten-year period and a cumulative reduction in real output of $17.4 billion over that same time period. More than 59 percent of the lost jobs would be jobs from the small business sector of the economy.

Introduction

Employers in all fifty states are required to offer workers a minimum wage in exchange for their labor. The primary federal statute in the area of minimum wages is the Fair Labor Standards Act (FLSA) of 1938 which, as amended, establishes a basic minimum wage that must be paid to covered workers. The current federal minimum wage is $7.25 per hour. States are permitted to establish their own minimum wages which have the potential to replace the federal rate as the basic minimum wage, provided that the state minimum wage established exceeds the federal rate. The effective minimum wage in the state of New Jersey is currently $7.25, equal to the federal rate (**Table 1**).

Table 1: Historical Effective Minimum Wage Rates for New Jersey

Year	Minimum Wage	Year	Minimum Wage
1972	$1.50	1993	$4.25
1973	$1.50	1994	$5.05
1974	$1.50	1995	$5.05
1975	$1.50	1996	$5.05
1976	$2.20	1997	$5.05
1977	$2.20	1998	$5.05
1978	$2.20	1999	$5.05
1979	$2.50	2000	$5.15
1980	$3.10	2001	$5.15
1981	$3.35	2002	$5.15
1982	$3.35	2003	$5.15
1983	$3.35	2004	$5.15
1984	$3.35	2005	$5.15
1985	$3.35	2006	$6.15
1986	$3.35	2007	$7.15
1987	$3.35	2008	$7.15
1988	$3.35	2009	$7.15
1989	$3.35	2010	$7.25
1990	$3.35	2011	$7.25
1991	$3.80	2012	$7.25
1992	$4.25	2013	$7.25

Source: Department of Labor

Despite an increase of 40.8 percent in the state minimum wage over the past decade, state legislators continue to push for additional increases. The most recent attempt in New Jersey takes the form of Senate Concurrent Resolution No. 1,[1] a constitutional amendment originally introduced October 1, 2012 in the state Senate and sponsored by Senators Stephen M. Sweeney

[1] SCR No. 1 is a concurrent resolution originally introduced in the NJ Senate that has been passed by both the state Senate and the Assembly. It was filed by the NJ Secretary of State on February 15, 2013. The policy as expressed in SCR No. 1 will now be put on the ballot. To amend the constitution, voters need only to vote affirmatively. No further legislative action is required, and this process does not involve the Governor.

and Shirley K. Turner and Assembly Members Sheila Y. Oliver, Timothy J. Eustace, and L. Grace Spencer. If passed, the bill would amend the New Jersey Constitution to raise the minimum wage to $8.25 per hour and tie future increases in the minimum wage to inflation, as measured by the Consumer Price Index for all urban wage earners and clerical workers (CPI-W) produced by the federal government.

This brief report quantifies the potential economic impact implementation of SCR No. 1 might have on New Jersey small businesses and their employees by using the Business Size Insight Module (BSIM). The BSIM is a dynamic, multi-region model based on the Regional Economic Models, Inc. (REMI) structural economic forecasting and policy analysis model which integrates input-output, computable general equilibrium, econometric, and economic geography methodologies. It has the unique ability to forecast the economic impact of public policy and proposed legislation on different categories of U.S. businesses differentiated by employee-size-of-firm. Forecast variables include levels of private sector employment and real output.[2] By comparing simulation results for scenarios which include proposed or yet-to-be-implemented policy changes with the model's baseline forecast, the BSIM is able to obtain estimates of how these policy changes could impact employer firms and their employees.

Description of New Employer Costs Under SCR No. 1

Minimum wage increases raise the cost of labor for employers.[3] SCR No. 1 is no exception to this rule. Increases to the New Jersey minimum wage law constitute a direct increase in employer costs. Assuming approval of the amendment in 2013, the bill would increase the minimum wage to $8.25 per hour on January 1, 2014. Annual adjustments in future years would be linked to increases in the cost of living as measured by the CPI-W.

The precise amount of additional wages employers must pay under SCR No. 1 is uncertain since future wage increases depend upon future (unknown) cost of living adjustments (COLA). Due to this uncertainty, the analysis in this report relies on a set of three different COLA paths which, with the assistance of the BSIM, provide a *range* of potential employment and production effects resulting from SCR No. 1's implementation. The three paths chosen for this analysis were a path with no increases in the cost of living in future years, a path with two percent annual increases in the cost of living, and a path with four percent annual increases in the cost of living. These three paths, given historical rates of increases in the cost of living, can reasonably be expected to include within their range the actual, realized path of future cost of

[2] The REMI model is used by a diverse group of clients spanning academia, private consulting firms, local and regional governments, and nonprofits, to name a few categories. A sample of clients include the Massachusetts Institute of Technology, the AARP, the Urban Institute, and the Florida legislature. What distinguishes the BSIM from the REMI models employed by other users is the ability of the BSIM to generate results differentiated by employee-size-of-firm.

[3] Good overviews of the literature on the minimum wage can be found in:

Brown, Charles, Curtis Gilroy, and Andrew Cohen, "The Effect of the Minimum Wage on Employment and Unemployment: A Survey," NBER Working Paper No. 846, January 1982;

Neumark, David and William Wascher, "Minimum Wages, Labor Market Institutions, and Youth Employment: A Cross-National Analysis," Industrial and Labor Relations Review, Vol. 57, No. 2, January 2004.

living adjustments. **Table 2** presents the hypothetical paths the New Jersey minimum wage would take under these three scenarios assuming that SCR No. 1 is implemented in 2014.

Larger increases in cost of living adjustments translate to larger increases from the status quo minimum wage, leading to larger additional employer costs in future years. The additional per-employee wage burdens shouldered by employers in future years are presented in **Table 3** in percentage terms. Assuming zero percentage changes to the cost of living in future years, the increase of the minimum wage to $8.25 per hour represents a 13.8 percent increase in the minimum wage. In contrast, constant cost of living adjustments of two percent annually will result in a 36.0 percent increase in the minimum wage in 2023, ten years from today. Constant cost of living adjustments of four percent annually will result in a minimum wage that is 62.0 percent higher than it is today.

Table 2: Future New Jersey Minimum Wage Trajectories Under Different Cost of Living Adjustment Paths

Year	Hypothetical Minimum Wage Schedule, 0 Percent COLA Path	Hypothetical Minimum Wage Schedule, 2 Percent COLA Path	Hypothetical Minimum Wage Schedule, 4 Percent COLA Path
2013	$7.25	$7.25	$7.25
2014	$8.25	$8.25	$8.25
2015	$8.25	$8.42	$8.58
2016	$8.25	$8.58	$8.92
2017	$8.25	$8.75	$9.28
2018	$8.25	$8.93	$9.65
2019	$8.25	$9.11	$10.04
2020	$8.25	$9.29	$10.44
2021	$8.25	$9.48	$10.86
2022	$8.25	$9.67	$11.29
2023	$8.25	$9.86	$11.74

Table 3: Per-Employee Percentage Increase in Minimum Wage (Compared to Status Quo) Under Different Cost of Living Adjustment Paths

Year	Hypothetical Minimum Wage Schedule, 0 Percent COLA Path	Hypothetical Minimum Wage Schedule, 2 Percent COLA Path	Hypothetical Minimum Wage Schedule, 4 Percent COLA Path
2014	13.8%	13.8%	13.8%
2015	13.8%	16.1%	18.3%
2016	13.8%	18.4%	23.1%
2017	13.8%	20.8%	28.0%
2018	13.8%	23.2%	33.1%
2019	13.8%	25.6%	38.4%
2020	13.8%	28.1%	44.0%
2021	13.8%	30.7%	49.7%

2022	13.8%	33.3%	55.7%
2023	13.8%	36.0%	62.0%

An important aspect of modeling minimum wage increases is "tipped" employees. According to the U.S. Department of Labor (DOL), tipped employees are employees who "customarily and regularly receive more than $30 per month in tips."[4] Employers may use tips received by such employees as a credit against their minimum wage obligations to the employees, provided that a minimum cash wage, currently set to $2.13 per hour at the federal level, is also paid to the employees. States have the option of establishing their own cash wage. New Jersey's current cash wage is currently $2.13, equal to the federal level.[5] SCR No. 1 does not specifically reference tipped employees. For this analysis, it is assumed that the mandated cash wage paid to tipped employees adjusts according to the schedule of the state minimum wage on a dollar-for-dollar basis.

A second issue a modeler must concern himself with when modeling an increase in the state minimum wages is business size exemptions. Some states exempt businesses of a certain size from minimum wage requirements. The state of Illinois, for example, exempts employer firms with three or fewer employees from minimum wage laws. No such exemptions exist for the state of New Jersey, and all employer firms in the state are therefore assumed to be affected by SCR No. 1.

A third issue takes the form of potential "emulation effects" associated with individuals earning near (just above) the minimum wage. Individuals now earning between $7.25 per hour and $8.25 per hour will see their wages raised automatically to $8.25 per hour in 2014 if the amendment passes, although their wages may increase to even higher levels if employers attempt to maintain the pre-implementation wage structure. Other workers currently earn just slightly above $8.25 per hour and despite not being affected directly by the legislation, can be expected to pressure their employers for a raise in order to maintain the wage premium between them and the lowest-earning individuals in the economy. Failure to increase the wages of near-minimum-wage earners allows wage compression to occur and may result in workers expressing their dissatisfaction by reducing work effort or leaving. Research suggests that "relative wages are important to workers," and "firms may find it in their profit-maximizing interest to increase [near-minimum-wage] workers' wages when minimum wages increase, in an attempt to restore work effort."[6] These effects are also referred to as "spill over" effects in the minimum wage literature.[7]

[4] For detailed information on tipped employees, a useful resource is the DOL fact sheet available here: http://www.dol.gov/whd/regs/compliance/whdfs15.pdf.

[5] A good source for information on mandated cash wages paid to tipped employees by state is the National Restaurant Association's minimum wage map, available at http://www.restaurant.org/Downloads/PDFs/advocacy/maps/map_minwage_rates.

[6] Grossman, Jean Baldwin, "The Impact of the Minimum Wage on Other Wages," The Journal of Human Resources, Vol. 18, No. 3 (Summer 1983).

[7] "The Minimum Wage," FRBSF Economic Letter, The Federal Reserve Bank of San Francisco, October 11, 1996.

For the modeler, a key concern involves estimating how many workers can be expected to contribute to such emulation effects. Based upon state-level data from the Bureau of Labor Statistics, it was estimated that 15 percent of New Jersey's private sector employees less those individuals directly affected by SCR No. 1 would also see per capita raises equal to the dollar amount in wage increases experienced by workers earning *at* the minimum wage (equivalent to a $1.00 per hour increase effective January 1, 2014).[8] Future wage increases for these workers are assumed to occur simultaneously with the future scheduled increases in the minimum wage.[9]

Besides the direct cost of higher wages in an increased minimum wage scenario, there are significant additional employer costs in the form additional payroll taxes that must be paid on wage differentials. In general, an employer's share of payroll taxes equals 7.65 percent of employee wages and salary. Of this 7.65 percent, 6.2 percentage points are intended to fund old age, survivors, and disability insurance, and 1.45 percentage points go to paying for Medicare hospital insurance. Employers in all three modeled scenarios can expect to pay more in payroll taxes as a consequence of a minimum wage increase.

No Changes to Government Demand

Given that a mandated minimum wage has been in effect for decades, it is assumed that government mechanisms to monitor compliance with the statute are established and well-developed. An increase in the minimum wage therefore should not require the development of new government mechanisms or materially increase government administrative costs. Therefore, there are no projected increases in government demand resulting from the implementation of SCR No. 1.

Additional Private Spending in the Economy

Consumers in an economy have two choices of what to do with their after-tax income. They can either choose to spend it, thereby increasing consumption within the economy, or they can elect to save it, and in doing so potentially increase investment in the economy. Government stimulus programs frequently focus on transferring wealth to lower-earning individuals because of the strong likelihood that these individuals will elect to spend the additional wealth in the short run,

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[8] According to the Bureau of Labor Statistics, New Jersey wage earners at the 10th percentile earn $8.85 per hour, while those at the 25th percentile earned $11.85 per hour. Emulation effects can be assumed to occur among workers who earn near (within a few dollars of) the minimum wage. Workers at the 15th percentile currently earn less than four dollars more than the proposed new minimum wage level and can reasonably be expected to press for the restoration of the original wage structure. It is assumed that emulation effects do not occur for workers earning above the 15th percentile. For workers earning at or below the 15th percentile, it is assumed that earnings increase by $1.00 in 2014 and increase in future years according to the rate of inflation as measured by CPI-W.

[9] The assumption that wage changes due to emulation effects occur simultaneously with the minimum wage increase is supported by research suggesting that "any substantial emulation effects are not long delayed, which seems plausible because increases in the minimum are [typically] well-advertised in advance." See Gramlich, Edward M., "Impact of Minimum Wages on Other Wages, Employment, and Family Incomes," *Brookings Papers on Economic* Activity, The Brookings Institution, 1974, downloadable at: http://www.brookings.edu/~/media/projects/bpea/1976%202/1976b_bpea_gramlich_flanagan_wachter.pdf.

producing a temporary consumption-fueled boost to the economy, rather than to save. Consistent with expectations pertaining to increases in income for low-income workers, this analysis assumes that new additional income received by minimum wage earners is spent (and not saved),[10] leading to a commensurate and immediate increase in consumption equal to the full value of the cumulative wage boosts received. Seventy-five percent of this new spending is assumed to occur in the retail trade industry. Twenty-five percent is assumed to occur in services. This assumption will have a countervailing effect on any negative employment and growth effects predicted by the model.

[10] According to the Congressional Budget Office, "increases in disposable income are likely to boost purchases more for lower-income than for higher-income households. That difference arises, at least in part, because a larger share of people in lower-income households cannot borrow as much money as they would wish in order to spend more than they do currently." See: "The Economic Outlook and Fiscal Policy Choices: Statement of Douglas W. Elmendorf, before the Committee on the Budget, United States Senate," Congressional Budget Office, September 28, 2010, p. 36.

Simulation Results

BSIM simulation results for the three modeled scenarios are provided below. The unit for all employment figures is number of employees, while output figures are presented in billions of dollars. Job losses forecast in year 2023 range from approximately 14,000 to 32,000. In all three scenarios, the small business sector is projected to shoulder at least 59 percent of the job losses. Estimates of the reduction in real output[11] from its baseline in year 2023 range from approximately $1.6 billion to $4.2 billion. The results suggest that the cumulative reduction in real output between 2014 and 2023 could exceed $17.4 billion.

Simulation Results for a Minimum Wage Increase with a Zero Percent COLA Path

For the scenario of a minimum wage increase with no assumed future cost of living adjustments, the BSIM forecasts that there will be approximately 14,000 fewer jobs in 2023 due to the implementation of SCR No. 1 (**Table 4**). More than 60 percent of the jobs lost in the zero percent inflation scenario are in the small business sector (using the Small Business Administration's definition (employer firms with fewer than 500 employees)). In addition, New Jersey gross domestic product is forecast to be more than $1.5 billion less in 2023 compared to the baseline scenario (in which no minimum wage increase takes place) (**Table 5**).

Table 4: Employment Difference from Baseline (Number of Employees), Zero Percent Cost of Living Increase Path

Firm Size	2014	2015	2016	2017	2018	2019	2020	2021	2022	2023	Percent of Total (2023)
1-4 Employees	554	214	-128	-436	-700	-918	-1,092	-1,226	-1,326	-1,401	10.2%
5-9 Employees	490	194	-95	-357	-579	-756	-898	-1,009	-1,088	-1,143	8.4%
10-19 Employees	499	155	-182	-484	-740	-945	-1,110	-1,234	-1,323	-1,384	10.1%
20-99 Employees	819	140	-512	-1,092	-1,573	-1,959	-2,257	-2,476	-2,628	-2,728	19.9%
100-499 Employees	447	17	-382	-728	-1,009	-1,231	-1,398	-1,517	-1,592	-1,640	12.0%
500 + Employees	2,344	514	-1,050	-2,332	-3,334	-4,095	-4,651	-5,023	-5,256	-5,383	39.4%
< 20 Employees	1,543	563	-405	-1,277	-2,019	-2,619	-3,100	-3,469	-3,737	-3,928	28.7%
< 100 Employees	2,362	703	-917	-2,369	-3,592	-4,578	-5,357	-5,945	-6,365	-6,656	48.7%
< 500 Employees	2,809	720	-1,299	-3,097	-4,601	-5,809	-6,755	-7,462	-7,957	-8,296	60.6%
All Firms	**5,153**	**1,234**	**-2,349**	**-5,429**	**-7,935**	**-9,904**	**-11,406**	**-12,485**	**-13,213**	**-13,679**	**100.0%**

[11] The term "output" refers to the aggregate output of the New Jersey economy (NJ gross domestic product (GDP)). GDP has three possible definitions: (1) the value of final goods and services produced in an economy during a given period (as opposed to raw materials or intermediate goods which are produced or sourced earlier in the production process), (2) the sum of value added during a given period, or (3) the sum of incomes in the economy during a given period. It is a technical term whose significance may be better understood by the reader if she considers that because of the first definition, output serves as a rough proxy for sales.

Table 5: Real Output Difference from Baseline ($Billions), Zero Percent Cost of Living Increase Path

Firm Size	2014	2015	2016	2017	2018	2019	2020	2021	2022	2023	Percent of Total (2023)
1-4 Employees	0.033	-0.003	-0.039	-0.071	-0.098	-0.120	-0.138	-0.150	-0.159	-0.165	10.5%
5-9 Employees	0.031	0.001	-0.028	-0.054	-0.077	-0.094	-0.108	-0.118	-0.125	-0.130	8.3%
10-19 Employees	0.031	-0.002	-0.036	-0.067	-0.091	-0.112	-0.127	-0.139	-0.147	-0.151	9.6%
20-99 Employees	0.053	-0.015	-0.082	-0.142	-0.192	-0.231	-0.261	-0.281	-0.294	-0.301	19.2%
100-499 Employees	0.030	-0.017	-0.061	-0.099	-0.130	-0.154	-0.171	-0.182	-0.189	-0.192	12.3%
500 + Employees	0.173	-0.019	-0.187	-0.325	-0.433	-0.513	-0.570	-0.604	-0.622	-0.627	40.0%
< 20 Employees	0.095	-0.004	-0.103	-0.192	-0.266	-0.326	-0.373	-0.407	-0.431	-0.446	28.5%
< 100 Employees	0.148	-0.019	-0.185	-0.334	-0.458	-0.557	-0.634	-0.688	-0.725	-0.747	47.7%
< 500 Employees	0.178	-0.036	-0.246	-0.433	-0.588	-0.711	-0.805	-0.870	-0.914	-0.939	60.0%
All Firms	**0.351**	**-0.055**	**-0.433**	**-0.758**	**-1.021**	**-1.224**	**-1.375**	**-1.474**	**-1.536**	**-1.566**	**100.0%**

Simulation Results for a Minimum Wage Increase with a Two Percent COLA Path

For the scenario of a minimum wage increase with an assumed future cost of living adjustment path of two percent annually, the BSIM forecasts that there will be more than 22,000 fewer jobs in 2023 due to the implementation of SCR No. 1 (**Table 6**). Sixty percent of the jobs lost in the two percent inflation scenario are in the small business sector. In addition, New Jersey gross domestic product is forecast to be more than $2.8 billion less in 2023 compared to the baseline scenario (in which no minimum wage increase takes place) (**Table 7**).

Table 6: Employment Difference from Baseline (Number of Employees), Two Percent Cost of Living Increase Path

Firm Size	2014	2015	2016	2017	2018	2019	2020	2021	2022	2023	Percent of Total (2023)
1-4 Employees	554	303	-2	-337	-673	-1,007	-1,329	-1,635	-1,923	-2,191	9.7%
5-9 Employees	490	273	11	-268	-546	-827	-1,093	-1,345	-1,582	-1,801	7.9%
10-19 Employees	499	237	-78	-411	-748	-1,080	-1,400	-1,696	-1,972	-2,235	9.8%
20-99 Employees	819	271	-366	-1,036	-1,702	-2,342	-2,963	-3,540	-4,075	-4,571	20.1%
100-499 Employees	447	90	-310	-722	-1,131	-1,521	-1,893	-2,234	-2,541	-2,830	12.5%
500 + Employees	2,344	883	-610	-2,082	-3,484	-4,799	-6,036	-7,151	-8,154	-9,067	40.0%
< 20 Employees	1,543	813	-69	-1,016	-1,967	-2,914	-3,822	-4,676	-5,477	-6,227	27.4%
< 100 Employees	2,362	1,084	-435	-2,052	-3,669	-5,256	-6,785	-8,216	-9,552	-10,798	47.6%
< 500 Employees	2,809	1,174	-745	-2,774	-4,800	-6,777	-8,678	-10,450	-12,093	-13,628	60.0%
All Firms	**5,153**	**2,057**	**-1,355**	**-4,856**	**-8,284**	**-11,576**	**-14,714**	**-17,601**	**-20,247**	**-22,695**	**100.0%**

Table 7: Real Output Difference from Baseline ($Billions), Two Percent Cost of Living Increase Path

Firm Size	2014	2015	2016	2017	2018	2019	2020	2021	2022	2023	Percent of Total (2023)
1-4 Employees	0.033	0.002	-0.034	-0.073	-0.112	-0.151	-0.189	-0.225	-0.260	-0.292	10.2%
5-9 Employees	0.031	0.006	-0.023	-0.054	-0.086	-0.117	-0.148	-0.176	-0.204	-0.228	8.0%
10-19 Employees	0.031	0.003	-0.032	-0.068	-0.105	-0.142	-0.178	-0.211	-0.242	-0.271	9.5%
20-99 Employees	0.053	-0.007	-0.077	-0.151	-0.226	-0.298	-0.368	-0.433	-0.494	-0.551	19.3%
100-499 Employees	0.030	-0.012	-0.059	-0.108	-0.157	-0.204	-0.249	-0.289	-0.326	-0.360	12.6%
500 + Employees	0.173	0.008	-0.164	-0.335	-0.499	-0.653	-0.799	-0.931	-1.051	-1.160	40.5%
< 20 Employees	0.095	0.011	-0.089	-0.195	-0.303	-0.410	-0.515	-0.612	-0.706	-0.791	27.6%
< 100 Employees	0.148	0.004	-0.166	-0.346	-0.529	-0.708	-0.883	-1.045	-1.200	-1.342	46.9%
< 500 Employees	0.178	-0.008	-0.225	-0.454	-0.686	-0.912	-1.132	-1.334	-1.526	-1.702	59.5%
All Firms	**0.351**	**0.000**	**-0.389**	**-0.789**	**-1.185**	**-1.565**	**-1.931**	**-2.265**	**-2.577**	**-2.862**	**100.0%**

Simulation Results for a Minimum Wage Increase with a Four Percent COLA Path

For the scenario of a minimum wage increase with an assumed future cost of living adjustment path of four percent annually, the BSIM forecasts that there will be over 31,000 fewer jobs in 2023 due to the implementation of SCR No. 1 (**Table 8**). More than 59 percent of the jobs lost in the four percent inflation scenario are in the small business sector. In addition, New Jersey gross domestic product is forecast to be more than $4.2 billion less in 2023 compared to the baseline scenario (in which no minimum wage increase takes place) (**Table 9**).

Table 8: Employment Difference from Baseline (Number of Employees), Four Percent Cost of Living Increase Path

Firm Size	2014	2015	2016	2017	2018	2019	2020	2021	2022	2023	Percent of Total (2023)
1-4 Employees	554	396	123	-226	-629	-1,068	-1,534	-2,011	-2,483	-2,960	9.3%
5-9 Employees	490	350	124	-169	-507	-875	-1,265	-1,660	-2,057	-2,450	7.7%
10-19 Employees	499	315	31	-329	-738	-1,183	-1,658	-2,134	-2,603	-3,072	9.7%
20-99 Employees	819	402	-212	-957	-1,795	-2,699	-3,638	-4,578	-5,517	-6,435	20.2%
100-499 Employees	447	162	-236	-709	-1,236	-1,791	-2,373	-2,946	-3,507	-4,059	12.8%
500 + Employees	2,344	1,257	-141	-1,779	-3,559	-5,428	-7,352	-9,232	-11,052	-12,821	40.3%
< 20 Employees	1,543	1,061	278	-724	-1,874	-3,126	-4,457	-5,805	-7,143	-8,482	26.7%
< 100 Employees	2,362	1,463	66	-1,681	-3,669	-5,825	-8,095	-10,383	-12,660	-14,917	46.9%
< 500 Employees	2,809	1,625	-170	-2,390	-4,905	-7,616	-10,468	-13,329	-16,167	-18,976	59.7%
All Firms	**5,153**	**2,882**	**-311**	**-4,169**	**-8,464**	**-13,044**	**-17,820**	**-22,561**	**-27,219**	**-31,797**	**100.0%**

Table 9: Real Output Difference from Baseline ($Billions), Four Percent Cost of Living Increase Path

Firm Size	2014	2015	2016	2017	2018	2019	2020	2021	2022	2023	Percent of Total (2023)
1-4 Employees	0.033	0.008	-0.029	-0.074	-0.125	-0.181	-0.242	-0.302	-0.363	-0.425	10.1%
5-9 Employees	0.031	0.011	-0.018	-0.054	-0.096	-0.140	-0.187	-0.234	-0.284	-0.332	7.9%
10-19 Employees	0.031	0.008	-0.027	-0.069	-0.117	-0.169	-0.224	-0.282	-0.337	-0.394	9.3%
20-99 Employees	0.053	0.002	-0.072	-0.160	-0.258	-0.365	-0.476	-0.588	-0.700	-0.811	19.2%
100-499 Employees	0.030	-0.007	-0.058	-0.118	-0.183	-0.253	-0.326	-0.398	-0.469	-0.539	12.8%
500 + Employees	0.173	0.035	-0.136	-0.337	-0.557	-0.788	-1.028	-1.264	-1.494	-1.721	40.8%
< 20 Employees	0.095	0.027	-0.074	-0.197	-0.338	-0.490	-0.653	-0.818	-0.984	-1.151	27.3%
< 100 Employees	0.148	0.029	-0.146	-0.357	-0.596	-0.855	-1.129	-1.406	-1.684	-1.962	46.5%
< 500 Employees	0.178	0.022	-0.204	-0.475	-0.779	-1.108	-1.455	-1.804	-2.153	-2.501	59.2%
All Firms	**0.351**	**0.057**	**-0.340**	**-0.812**	**-1.336**	**-1.896**	**-2.483**	**-3.068**	**-3.647**	**-4.222**	**100.0%**

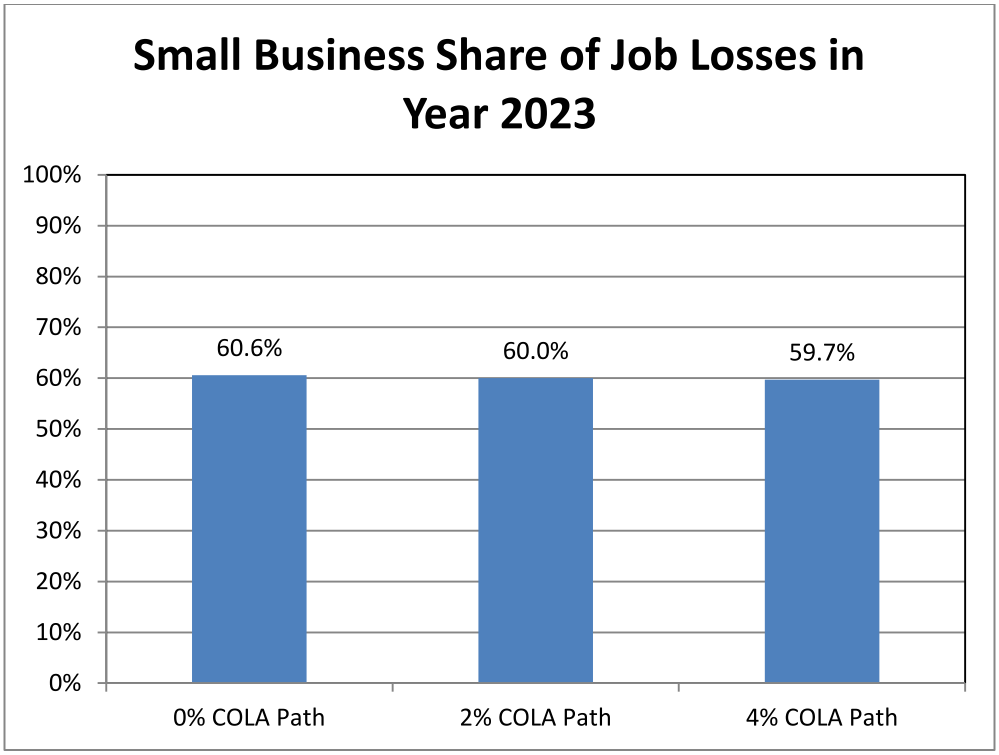

Figure 1

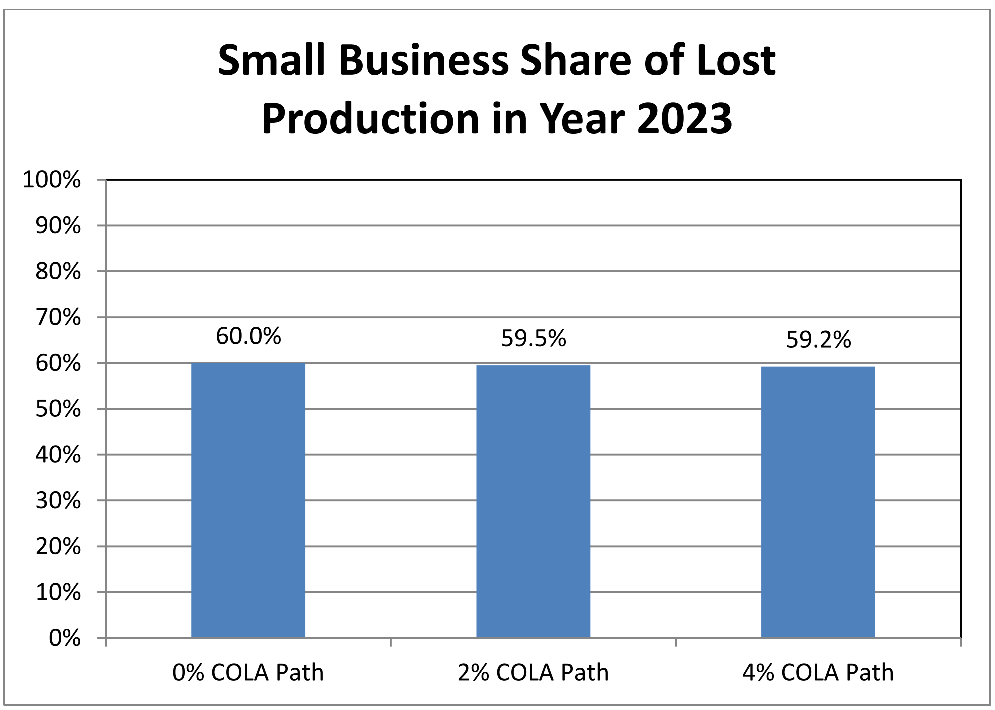

Figure 2

Appendix: Remarks Concerning Alleged Counterfactual Evidence Regarding Minimum Wage Effects on Employment

Research on the economic effects of minimum wage policy consists of a rich literature spanning decades. This body of literature includes studies whose results contradict the basic economic principle of the law of demand, suggesting that increases in the minimum wage have no impact on low-wage employment and may even have a modest positive effect. This section discusses two popular studies within this counterfactual literature and notes certain methodological problems which introduce uncertainty with respect to their findings.

A controversial and well-cited study on the minimum wage dating from the mid-1990s is Card and Krueger's investigation of the impact of the April 1, 1992 increase in the New Jersey minimum wage from $4.25 to $5.05 per hour.[12] Card and Kruger used a telephone survey to compare the experiences of 410 fast-food restaurants in New Jersey and Pennsylvania—331 in New Jersey and 79 in eastern Pennsylvania—following the increase in New Jersey's minimum wage. The Pennsylvania restaurants included in the survey served as a control group with which New Jersey restaurants (and their experiences) could be compared since, in the authors' opinions, "New Jersey is a relatively small state with an economy that is closely linked to nearby states" and no contemporary increase in Pennsylvania's minimum wage occurred during the time period studied. In summarizing their findings, the authors claim to have found "no evidence that the rise in New Jersey's minimum wage reduced employment at fast-food restaurants in the state." Contrary to conventional wisdom, the authors even found "that the increase in the minimum wage increased employment." In a follow-up study using different data (from the Bureau of Labor Statistics), the authors moderated their conclusion to the following: "The increase in New Jersey's minimum wage probably had no effect on total employment in New Jersey's fast-food industry, and possibly had a small positive effect."[13]

The motivation for Card and Kruger's follow-up study stems from criticism of the methodology employed in the authors' first study. In particular, concerns about noisy measurement, the unit of measure investigated (critics claimed that the study's focus should have been the number of hours worked by employees, not the number of employees itself), and inconsistencies between Card and Kruger's data set and actual payroll data from fast-food establishments in New Jersey and Pennsylvania incentivized the authors to perform subsequent research. These points aside, other criticisms that can be made about Card and Kruger's analysis. First, the authors focused on a relatively small geographic area. Second, the authors focused on fast-food *chains*, which are not the same as the fast-food *industry*, which is comprised of both chains and an independent sector. The independent sector has been observed to be "much more labour intensive than the chain sector."[14] This being the case, it is entirely possible for the chain sector of the fast-food industry to experience negligible effects due to a minimum wage increase,

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[12] Card, David and Alan B. Krueger, "Minimum Wages and Employment: A Case Study of the Fast-Food Industry in New Jersey and Pennsylvania," The American Economic Review, Vol. 84, No. 4, Sept. 1994, pp. 772-793.
[13] Card, David and Alan B. Krueger, "Minimum Wage and Employment: A Case Study of the Fast-Food Industry in New Jersey and Pennsylvania: Reply," The American Economic Review, Vol. 90, No. 5, Dec. 2000, pp. 1397-1420.
[14] Worstall, Tim, "Alan Krueger's Mistake on the Minimum Wage", Forbes, Aug. 31, 2011.

while the more labor-intensive independent sector (and the industry as a whole) experiences material negative employment effects due to the minimum wage increase. Third, by focusing on the fast-food industry, Card and Kruger leave out a significant subpopulation of the minimum wage workforce (employed outside of the fast-food industry). Fourth, the New Jersey minimum wage became effective two years after the legislation was passed. It is possible, and perhaps even likely, that some of the reaction among employer firms to the legislation occurred before the new minimum wage came into effect. To the extent that the examined time period excluded some employer's reactions to the minimum wage increase, the change in employment measured by Card and Kruger may be biased upward. Fifth, Card and Kruger focused on nationally-known fast-food enterprises rather than a representative sample of all eating establishments. Such a focus could bias results upward, as national chain restaurants may be better able to absorb wage increases than eating establishments in general. If such is the case, national chain restaurants may even gain market share and expand even as the industry as a whole loses employment.

The second study of some popularity which presents counterfactual evidence on the employment effects of minimum wage policy is much more recent. An article by Allegretto, Dube, and Reich (hereby ADR) published in 2011 asserts that minimum wage increases between 1990 and 2009 had essentially zero impact on teen employment (the authors rule out "any but very small disemployment effects").[15] Their results were obtained using a methodology that accounted for the (according to the authors) prior-to-then ignored "heterogeneous employment patterns that are correlated with selectivity among states with minimum wages." By including control variables for "long-term growth differences among states and for heterogeneous economic shocks," the authors achieve elasticities for employment and hours worked "indistinguishable from zero."

While the approach used by ADR holds some intuitive appeal, a thorough examination of the authors' methodology by Neumark, Salas, and Wascher (hereby NSW) "points to serious problems with [their] research designs."[16] NSW's analysis provides evidence that the tendency for including state-specific time trends into the baseline fixed-effects regression model typically used for minimum wage analysis to eliminate negative employment effects of minimum wages (during the time period studied) is due principally to the strong influence of the recessionary periods of the early 1990s or the Great Recession period. NSW show that when long-term trends are estimated in ways that are not highly sensitive to the business cycle, the estimated effects of minimum wages on teen employment are negative and statistically significant. NSW also address the second methodological technique used by ADR to obtain their counterfactual results, namely, the inclusion of a (Census Division x Period Interaction) term into the regression model. A justification for the inclusion of this term is that omitted factors could drive patterns of teen

[15] Allegretto, Sylvia A., Arindrajit Dube, and Michael Reich, "Do Minimum Wages Really Reduce Teen Employment? Accounting for Heterogeneity and Selectivity in State Panel Data," Industrial Relations, Vol. 50, No. 2, Apr. 2011, pp. 205-240.
[16] Neumark, David, J.M. Ian Salas, and William Wascher, "Revisiting the Minimum Wage-Employment Debate: Throsing Out the Baby with the Bathwater?", Discussion Paper No. 7166, IZA, January 2013.

employment differentially by Census division, and therefore this term should be included to capture those effects. Underlying this approach is the assumption that states within a Census division make better controls for states where minimum wages increase than are states in other Census divisions. NSW investigate this claim by utilizing two ranking algorithms to assess whether within-Census-division states truly do make for better controls.[17] The two algorithms include a synthetic control approach and a "ranked prediction error" approach. Both algorithms provide evidence which generally question the rationale for restricting control states to those in the same Census division. In light of these results, NSW conclude that "the evidence still shows that minimum wages pose a tradeoff of higher wages for some against job losses for others."

[17] The structures of the algorithms are non-trivial and details surrounding them are omitted from this report. Readers interested in learning more about the algorithms should refer to Neumark et al. noted in footnote 14.