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Economic Impact Analysis of Three Proposed Changes to Pennsylvania Minimum Wage Laws: HB 1039, HB 1057, and SB 326

This report analyzes the potential economic impact of implementing three proposed bills that seek to change to Pennsylvania minimum wage laws. Introduced during the 2013 session of the General Assembly of Pennsylvania, the three bills (HB 1039, HB 1057, and SB 326) seek to modify Pennsylvania minimum wage laws to provide for an increase in the wages earned by minimum wage workers. HB 1039 would increase the minimum wage in Pennsylvania to \$8.75 per hour beginning 30 days after the bill's passage and also provide for further increases to the minimum wage in future years, starting in 2015, dependent upon cost-of-living adjustments (COLA) calculated by applying rates of future inflation to existing wage rates. HB 1057 would increase the minimum wage in Pennsylvania to \$9.00 per hour beginning 30 days after its passage and also provide for further increases to the minimum wage in future years, starting in 2015, dependent upon cost-of-living adjustments. In contrast to the two house bills, SB 326 does not mandate a fixed dollar increase to the minimum wage in Pennsylvania, but would have allowed for increases to the minimum wage beginning in 2013 contingent upon cost-of-living adjustments. Although each bill alters the wage schedule of minimum wage workers in a different manner, assuming meaningful cost-of-living adjustments, all three bills can be expected to have negative long-term consequences for Pennsylvania's economy in the forms of lost jobs and reduced economic production. Depending upon the rate of inflation in future years, the most damaging of these bills, HB 1057, could result in over 118,000 lost jobs in Pennsylvania over a ten-year period and reduce real output by \$12.0 billion. More than half 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 Pennsylvania is currently \$7.25 per hour, the same as the federal rate (**Table 1**).

Table 1: Historical Effective Minimum Wage Rates for Non-farm Employment in Pennsylvania

Year	Minimum Wage	Year	Minimum Wage
1972	\$1.60	1993	\$4.25
1973	\$1.60	1994	\$4.25
1974	\$1.60	1995	\$4.25
1975	\$1.60	1996	\$4.25
1976	\$2.30	1997	\$4.75
1977	\$2.30	1998	\$5.15
1978	\$2.30	1999	\$5.15
1979	\$2.90	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	\$5.15
1986	\$3.35	2007	\$6.25
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 effective minimum wage in Pennsylvania over the past decade, state legislators continue to push for additional increases. The most recent attempts take the form of three bills introduced in the 2013 session of the General Assembly of Pennsylvania: HB 1039, HB 1057, and SB 326. HB 1039 would increase the minimum wage in Pennsylvania to \$8.75 per hour beginning 30 days after the bill's passage and also provide for further increases to the minimum wage in future years, starting in 2015, dependent upon cost-of-

living adjustments (COLA) calculated by applying rates of future inflation to existing wage rates. HB 1057 would increase the minimum wage in Pennsylvania to \$9.00 per hour beginning 30 days after its passage and also provide for further increases to the minimum wage in future years, starting in 2015, dependent upon cost-of-living adjustments. In contrast to the two house bills, SB 326 does not mandate a fixed dollar increase to the minimum wage in Pennsylvania, but would have allowed for increases to the minimum wage beginning in 2013 contingent upon cost-of-living adjustments. The proposed rate of inflation used to determine wage increases in future years¹ (cost-of-living adjustments) in all three bills is the Consumer Price Index for All Urban Consumers (CPI-U) for the Pennsylvania, New Jersey, Delaware, and Maryland area.

This brief report quantifies the potential economic impacts implementation of HB 1039, HB 1057, and SB 326 might have on Pennsylvania 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. 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 would impact employer firms and their employees.

Description of New Employer Costs Under HB 1039, HB 1057, and SB 326

Minimum wage increases raise the cost of labor for employers.² Contingent upon future rates of inflation, all three proposed bills directly raise the cost of labor through mandated increases to the Pennsylvania minimum wage. The precise amounts of additional wages employers must pay under HB 1039, HB 1057, or SB 326 are uncertain since future wage increases depend upon future (unknown) cost-of-living adjustments. **Table 2** and **Figure 1** present historical annual rates of inflation as measured by changes in the CPI-U for the Pennsylvania, New Jersey, Delaware, and Maryland area over the most recent 20 years with data available.³ As the rates in

¹ This analysis assumes that implementation of all three bills begins in January 2014. The term “future years” used above therefore refers to years 2015 and beyond. In analyzing and forecasting the economic impact of SB 326, it was assumed that no COLA is applied for year 2013 despite the bill’s language and its assumed implementation in 2014 (*i.e.*, no cost-of-living adjustment is applied retroactively). In the modeled wage schedule for SB 326, cost-of-living adjustments were applied beginning in 2014 to obtain wage rates for years 2015 and beyond.

² 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.

³ The CPI-U is a measure of the Consumer Price Index based upon the basket of goods and services for all urban consumers. Other measures of the Consumer Price Index exist, such as the CPI-W, which is a measure of the Consumer Price Index based upon the basket of goods and services for all urban wage and clerical workers, the

the table indicate, annual rates of inflation over the past two decades have almost universally fallen between zero percent and four percent. The most notable exception is the change in the CPI-U during 2008 when firms cut prices dramatically in response to the financial crisis and the associated Great Recession as consumer demand plummeted. The average annual rate of inflation for the most recent ten years with data available is 2.57 percent.

Table 2: Historical Rates of Annual Inflation as Measured by the CPI-U (PA-NJ-DE-MD)

Years	CPI-U
1992	2.46%
1993	2.93%
1994	2.65%
1995	2.58%
1996	2.27%
1997	1.02%
1998	2.20%
1999	2.68%
2000	2.72%
2001	1.99%
2002	2.11%
2003	4.08%
2004	3.92%
2005	3.87%
2006	2.19%
2007	3.41%
2008	-0.38%
2009	1.98%
2010	2.68%
2011	1.83%

Source: Bureau of Labor Statistics

Using these historical inflation rates as guidance, 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 implementation of each of the three bills. The three COLA 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 as measured by annual changes in the CPI-U, can reasonably be expected to include within their range the actual, realized path of future cost-of-living adjustments.

difference between the two therefore being the population of consumers sampled. The common thread among all measures of the CPI is the measurement of *consumer* baskets (of goods and services).

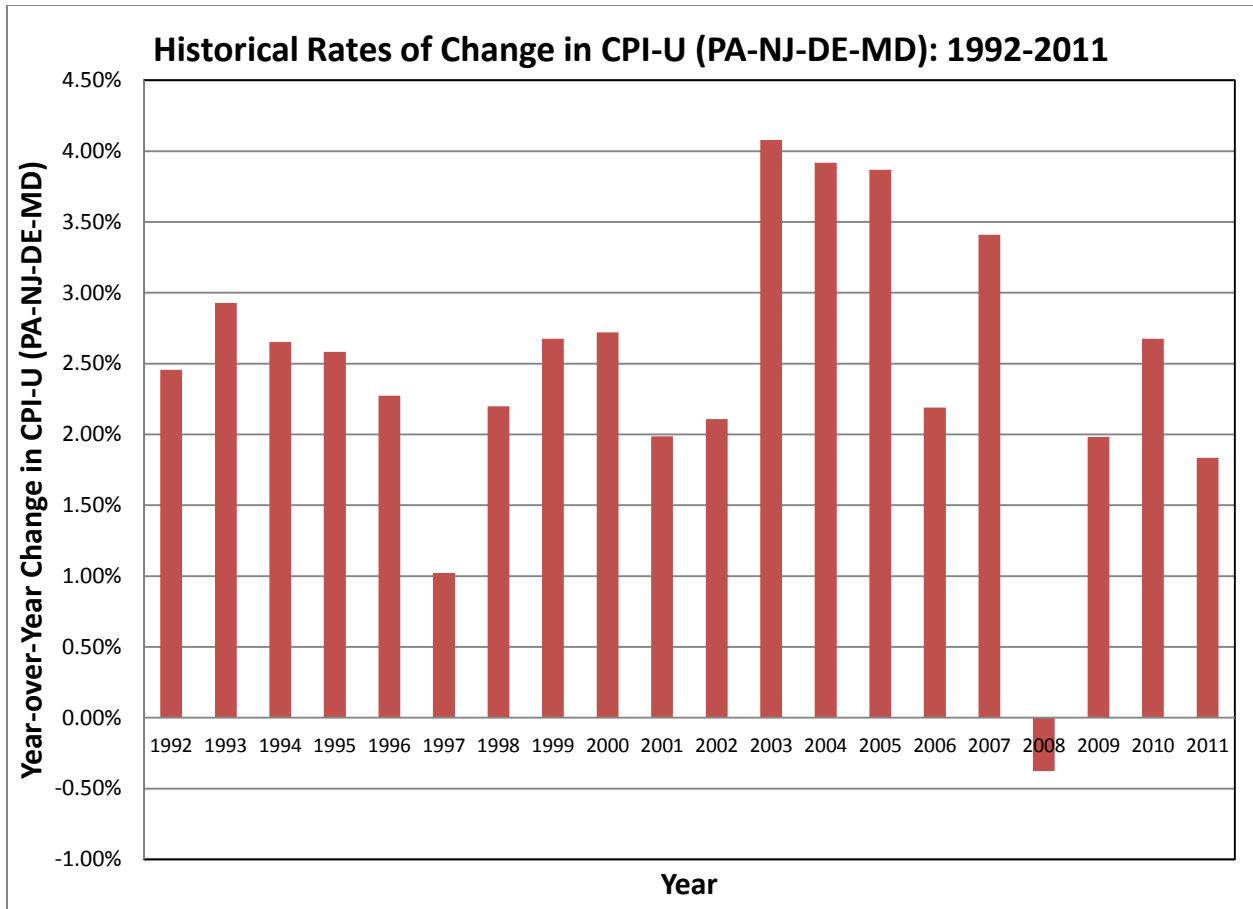


Figure 1

Table 3, Table 5, and Table 7 present the hypothetical paths the Pennsylvania minimum wage would take under these three inflation scenarios assuming implementation in 2014 of HB 1039, HB 1057, and SB 326, respectively. Larger cost-of-living adjustments translate to larger increases from the status quo minimum wage, resulting in larger additional employer costs in future years. At the high end of the assumed inflation range, the minimum wage could rise to as much as \$12.81 per hour by 2023. If cost-of-living adjustments follow a path of two percent inflation, a target rate of inflation that the Federal Reserve aims to achieve over the medium term, the minimum wage could still rise to \$10.76 per hour by 2023. The additional per-employee wage burdens shouldered by employers in future years assuming implementation of HB 1039, HB 1057, and SB 326 are presented in percentage terms in **Table 4, Table 6, and Table 8**, respectively. Increasing the minimum wage to \$12.81 per hour is equivalent to raising the cost of labor for employers of minimum wage workers by 76.7 percent. Raising the minimum wage to \$10.76 per hour is equivalent to raising the cost of labor for employers of minimum wage workers by 48.4 percent. These increases to the cost of labor are not inconsequential.

Table 3: Pennsylvania Minimum Wage Trajectories under Different Cost-of-Living Adjustment Paths Assuming Implementation of HB 1039

Year	Hypothetical Minimum Wage Schedule under HB 1039, 0 Percent COLA Path	Hypothetical Minimum Wage Schedule under HB 1039, 2 Percent COLA Path	Hypothetical Minimum Wage Schedule under HB 1039, 4 Percent COLA Path
2013	\$7.25	\$7.25	\$7.25
2014	\$8.75	\$8.75	\$8.75
2015	\$8.75	\$8.93	\$9.10
2016	\$8.75	\$9.10	\$9.46
2017	\$8.75	\$9.29	\$9.84
2018	\$8.75	\$9.47	\$10.24
2019	\$8.75	\$9.66	\$10.65
2020	\$8.75	\$9.85	\$11.07
2021	\$8.75	\$10.05	\$11.51
2022	\$8.75	\$10.25	\$11.97
2023	\$8.75	\$10.46	\$12.45

Table 4: Percentage Increase in Pennsylvania Minimum Wage (Compared to Status Quo) Under Different Cost-of-Living Adjustment Paths Assuming Implementation of HB 1039

Year	Percentage Increase in PA Minimum Wage under HB 1039, 0 Percent COLA Path	Percentage Increase in PA Minimum Wage under HB 1039, 2 Percent COLA Path	Percentage Increase in PA Minimum Wage under HB 1039, 4 Percent COLA Path
2014	20.7%	20.7%	20.7%
2015	20.7%	23.1%	25.5%
2016	20.7%	25.6%	30.5%
2017	20.7%	28.1%	35.8%
2018	20.7%	30.6%	41.2%
2019	20.7%	33.3%	46.8%
2020	20.7%	35.9%	52.7%
2021	20.7%	38.6%	58.8%
2022	20.7%	41.4%	65.2%
2023	20.7%	44.2%	71.8%

Table 5: Pennsylvania Minimum Wage Trajectories under Different Cost-of-Living Adjustment Paths Assuming Implementation of HB 1057

Year	Hypothetical Minimum Wage Schedule under HB 1057, 0 Percent COLA Path	Hypothetical Minimum Wage Schedule under HB 1057, 2 Percent COLA Path	Hypothetical Minimum Wage Schedule under HB 1057, 4 Percent COLA Path
2013	\$7.25	\$7.25	\$7.25
2014	\$9.00	\$9.00	\$9.00
2015	\$9.00	\$9.18	\$9.36

2016	\$9.00	\$9.36	\$9.73
2017	\$9.00	\$9.55	\$10.12
2018	\$9.00	\$9.74	\$10.53
2019	\$9.00	\$9.94	\$10.95
2020	\$9.00	\$10.14	\$11.39
2021	\$9.00	\$10.34	\$11.84
2022	\$9.00	\$10.54	\$12.32
2023	\$9.00	\$10.76	\$12.81

Table 6: Percentage Increase in Pennsylvania Minimum Wage (Compared to Status Quo) Under Different Cost-of-Living Adjustment Paths Assuming Implementation of HB 1057

Year	Percentage Increase in PA Minimum Wage under HB 1057, 0 Percent COLA Path	Percentage Increase in PA Minimum Wage under HB 1057, 2 Percent COLA Path	Percentage Increase in PA Minimum Wage under HB 1057, 4 Percent COLA Path
2014	24.1%	24.1%	24.1%
2015	24.1%	26.6%	29.1%
2016	24.1%	29.2%	34.3%
2017	24.1%	31.7%	39.6%
2018	24.1%	34.4%	45.2%
2019	24.1%	37.1%	51.0%
2020	24.1%	39.8%	57.1%
2021	24.1%	42.6%	63.4%
2022	24.1%	45.4%	69.9%
2023	24.1%	48.4%	76.7%

Table 7: Pennsylvania Minimum Wage Trajectories under Different Cost-of-Living Adjustment Paths Assuming Implementation of SB 326

Year	Hypothetical Minimum Wage Schedule under SB 326, 0 Percent COLA Path	Hypothetical Minimum Wage Schedule under SB 326, 2 Percent COLA Path	Hypothetical Minimum Wage Schedule under SB 326, 4 Percent COLA Path
2013	\$7.25	\$7.25	\$7.25
2014	\$7.25	\$7.25	\$7.25
2015	\$7.25	\$7.40	\$7.54
2016	\$7.25	\$7.54	\$7.84
2017	\$7.25	\$7.69	\$8.16
2018	\$7.25	\$7.85	\$8.48
2019	\$7.25	\$8.00	\$8.82
2020	\$7.25	\$8.16	\$9.17
2021	\$7.25	\$8.33	\$9.54
2022	\$7.25	\$8.49	\$9.92
2023	\$7.25	\$8.66	\$10.32

Table 8: Percentage Increase in Pennsylvania Minimum Wage (Compared to Status Quo) Under Different Cost-of-Living Adjustment Paths Assuming Implementation of SB 326

Year	Percentage Increase in PA Minimum Wage under SB 326, 0 Percent COLA Path	Percentage Increase in PA Minimum Wage under SB 326, 2 Percent COLA Path	Percentage Increase in PA Minimum Wage under SB 326, 4 Percent COLA Path
2014	0.0%	0.0%	0.0%
2015	0.0%	2.0%	4.0%
2016	0.0%	4.0%	8.2%
2017	0.0%	6.1%	12.5%
2018	0.0%	8.2%	17.0%
2019	0.0%	10.4%	21.7%
2020	0.0%	12.6%	26.5%
2021	0.0%	14.9%	31.6%
2022	0.0%	17.2%	36.9%
2023	0.0%	19.5%	42.3%

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. Pennsylvania’s current cash wage is \$2.83 per hour.⁵ None of HB 1039, HB 1057, or SB 326 specifically mentions tipped employees, but it is reasonable to assume that if wages are increased for workers earning the minimum wage, tipped workers will view an increase in their own minimum cash wage as only fair and will demand an increase in the minimum cash wage. For this analysis, it is assumed that the mandated cash wage paid to tipped employees adjusts on a dollar-for-dollar basis equal to changes in the state minimum wage according to the wage schedules provided in Tables 3, 5, and 7. Whether the increase in the cash wage occurs as a result of a mandate in subsequent legislation or because employers simply respond to worker demands is immaterial so far as modeling inputs to the BSIM is concerned.

A second issue a modeler must concern himself with when modeling an increase in the state minimum wage 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 Pennsylvania, and employers in all employee-size-of-firm categories in the state are therefore assumed to be required to comply with all three of HB 1039, HB 1057, and SB 326.

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 Information on mandated cash wages paid to tipped employees by state is available from the Department of Labor’s Wage and Hour Division at <http://www.dol.gov/whd/state/tipped.htm>.

A third issue takes the form of potential “emulation effects” associated with individuals earning near (just above) the minimum wage. Some of these individuals will earn between \$7.25 per hour and the higher wages mandated in 2014 for HB 1039 and HB 1057 (\$8.75 per hour and \$9.00 per hour, respectively). In the absence of employer action, these workers will see their wages raised automatically to these new levels contingent upon the passage of the respective bills. However, wages for these workers may increase to even higher levels if employers attempt to maintain the pre-implementation wage structure and raise wages for these workers to levels above the new minimum wage. Other workers will earn just slightly above the new minimum wage levels and despite not being affected directly by either HB 1039 or HB 1057, 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 and allowing wage compression to occur 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 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, for this analysis, in scenarios in which it was assumed that either HB 1039 or HB 1057 was implemented, it was adjudged that 15 percent of Pennsylvania’s private sector employees less those individuals directly affected by HB 1039 and HB 1057 would also see per capita raises equal to the dollar amount in wage increases experienced by workers earning *at* the minimum wage in 2014.⁷ For scenarios in which it is assumed that SB 326 is implemented, the modeler need not concern himself with emulation effects in 2014 since there is no fixed-amount increase in the first year of implementation. However, emulation effects can be expected to potentially occur in all three scenarios in out years following 2014 due to cost-of-living adjustments.⁸

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

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 According to the Bureau of Labor Statistics, Pennsylvania wage earners at the 10th percentile earn \$8.73 per hour, while those at the 25th percentile earned \$11.14 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 three dollars more than the proposed new minimum wage levels in 2014 under both HB 1039 and HB 1057 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 \$1.50 per hour in 2014 if HB 1039 is implemented, and by \$1.75 per hour if HB 1057 is implemented.

⁸ 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.

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 help fund old age, survivors, and disability insurance, and 1.45 percentage points go toward helping to pay 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, assuming non-zero rates of future inflation.⁹

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. Hence, the analysis assumes no projected increases in government demand resulting from the implementation of any of HB 1039, HB 1057, or SB 326.

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, producing a consumption-fueled boost to the economy, rather than to save.¹⁰ 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), leading to an increase in consumption.

In the analysis, the conversion of higher labor costs for employers into increased consumption by workers receiving wage increases occurs automatically due to the way in which wage costs are inputted into the BSIM. Since employer costs described in this analysis derive from an increase in the minimum wage, the costs were inputted into the BSIM under the "Wage Labor Cost" variable. The costs were distributed across different industry categories and different employee-size-of-business categories according to existing industry and business size distributions published in the Census Bureau's Statistics on U.S. Businesses dataset. This distribution allows the BSIM to generate results for separate employee-size-of-firm categories.

⁹ Payroll taxes modeled in this analysis only include federal taxes. An increase in the PA minimum wage could also impact state payroll taxes paid by employers.

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.

Increases in the “Wage Labor Cost” variable in the BSIM translate directly to increases in the “Compensation Rate” policy variable which is used in intermediate calculations during the simulation process. During simulations, such compensation rate increases are directly “fed back” into the economy in the form of higher consumer spending on the part of workers who now have extra money to spend. Such dynamics are important in a minimum wage simulation since, as mentioned previously, it is believed that during cases involving the transfer of wealth to lower-earning individuals, there is a strong likelihood that these individuals will elect to spend the additional wealth (rather than save), producing a consumption-fueled boost to the economy. Concerns that minimum wage increases may provide a countervailing spending “stimulus” effect to the economy are therefore satisfied automatically in this analysis.

Simulation Results

BSIM simulation results for the three modeled legislative scenarios (implementation of HB 1039, HB 1057, or SB 326 beginning in 2014) are provided below for each of the three assumed COLA paths (zero percent inflation, two percent inflation, and four percent inflation). The number of different legislation/inflation combinations means that, in total, nine different scenarios were simulated. All employment figures are expressed as number of employees, while output figures are presented in billions of 2005 dollars.

Disregarding the unlikely scenario in which SB 326 is implemented and future inflation is zero, under the above assumptions, job losses forecast in year 2023 range from a low of 28,000 to as many as 119,000 fewer jobs than there would have been in the absence of a minimum wage increase. For any assumed rate of future inflation, job losses are most acute under the assumption that HB 1057 is implemented. Under all three legislative scenarios, the small business sector¹¹ is projected to shoulder at least 58 percent of the job losses (with the exception of the unlikely case of the implementation of SB 326 and zero percent future inflation, which is no different from the baseline forecast). Estimates of the reduction in real output¹² in more likely scenarios from its baseline forecast (in which no legislation is assumed to take effect) in year 2023 range from approximately \$2.8 billion to \$12.0 billion. The BSIM forecasts that cumulative real output losses over the course of the ten-year forecast window could be as high as \$65.0 billion.

¹¹ This analysis adopts the Small Business Administration’s size-of-business threshold of 500 employees to distinguish between small businesses and large businesses. The 500-employee threshold is frequently used by researchers to delineate the small business sector when working with firm-size data.

¹² The term “output” refers to the aggregate output of the Pennsylvania economy (PA 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.

Brief discussions of the results for all nine simulated scenarios are provided below along with detailed tables in which the forecast results are segmented into different employee-size-of-firm categories.

Simulation Results for a Minimum Wage Increase as Outlined in HB 1039

Assuming the implementation of HB 1039 in 2014:

- For a scenario with assumed future cost-of-living adjustments of zero percent, the BSIM forecasts that there will be 46,000 fewer jobs in 2023 due to the implementation of HB 1039 (**Table 9**). More than 59 percent of the jobs lost in this zero percent inflation scenario are in the small business sector. In addition, Pennsylvania gross domestic product is forecast to be \$4.4 billion less in 2023 compared to the baseline scenario (**Table 12**). The cumulative real output loss during the ten-year forecast window in this scenario totals \$32.5 billion.
- For a scenario with assumed annual future cost-of-living adjustments of two percent, the BSIM forecasts that there will be 77,000 fewer jobs in 2023 due to the implementation of HB 1039 (**Table 10**). More than 59 percent of the jobs lost in this two percent inflation scenario are in the small business sector. In addition, Pennsylvania gross domestic product is forecast to be \$7.6 billion less in 2023 compared to the baseline scenario (**Table 13**). The cumulative real output loss during the ten-year forecast window in this scenario totals \$45.4 billion.
- For a scenario with assumed annual future cost-of-living adjustments of four percent, the BSIM forecasts that there will be 110,000 fewer jobs in 2023 due to the implementation of HB 1039 (**Table 11**). More than 58 percent of the jobs lost in this four percent inflation scenario are in the small business sector. In addition, Pennsylvania gross domestic product is forecast to be \$11.1 billion less in 2023 compared to the baseline scenario (**Table 14**). The cumulative real output loss during the ten-year forecast window in this scenario totals \$59.1 billion.

Table 9: Employment Difference from Baseline (Number of Employees) under HB 1039, Zero Percent Cost-of-Living Adjustment Path

Firm Size	2014	2015	2016	2017	2018	2019	2020	2021	2022	2023	Percent of Total (2023)
1-4 Employees	-661	-1,309	-1,904	-2,424	-2,861	-3,187	-3,432	-3,613	-3,738	-3,822	8.3%
5-9 Employees	-660	-1,300	-1,881	-2,384	-2,798	-3,106	-3,339	-3,505	-3,621	-3,693	8.0%
10-19 Employees	-768	-1,519	-2,210	-2,808	-3,307	-3,671	-3,944	-4,141	-4,273	-4,357	9.5%
20-99 Employees	-1,644	-3,229	-4,651	-5,872	-6,887	-7,626	-8,180	-8,570	-8,832	-8,994	19.5%
100-499 Employees	-1,193	-2,427	-3,517	-4,439	-5,188	-5,726	-6,123	-6,402	-6,577	-6,681	14.5%
500 + Employees	-3,418	-7,162	-10,328	-12,911	-14,951	-16,349	-17,338	-17,981	-18,369	-18,557	40.3%
< 20 Employees	-2,089	-4,128	-5,995	-7,616	-8,966	-9,964	-10,715	-11,259	-11,632	-11,872	25.8%
< 100 Employees	-3,733	-7,357	-10,646	-13,488	-15,853	-17,590	-18,895	-19,829	-20,464	-20,866	45.3%
< 500 Employees	-4,926	-9,784	-14,163	-17,927	-21,041	-23,316	-25,018	-26,231	-27,041	-27,547	59.7%
All Firms	-8,344	-16,946	-24,491	-30,838	-35,992	-39,665	-42,356	-44,212	-45,410	-46,104	100.0%

Table 10: Employment Difference from Baseline (Number of Employees) under HB 1039, Two Percent Cost-of-Living Adjustment Path

Firm Size	2014	2015	2016	2017	2018	2019	2020	2021	2022	2023	Percent of Total (2023)
1-4 Employees	-661	-1,376	-2,113	-2,834	-3,532	-4,152	-4,723	-5,251	-5,730	-6,176	8.0%
5-9 Employees	-660	-1,370	-2,091	-2,804	-3,480	-4,086	-4,643	-5,157	-5,628	-6,065	7.9%
10-19 Employees	-768	-1,599	-2,456	-3,300	-4,110	-4,832	-5,496	-6,106	-6,666	-7,180	9.3%
20-99 Employees	-1,644	-3,405	-5,183	-6,928	-8,599	-10,081	-11,448	-12,702	-13,858	-14,925	19.4%
100-499 Employees	-1,193	-2,559	-3,917	-5,232	-6,476	-7,578	-8,594	-9,517	-10,366	-11,156	14.5%
500 + Employees	-3,418	-7,547	-11,523	-15,269	-18,775	-21,821	-24,603	-27,118	-29,417	-31,537	40.9%
< 20 Employees	-2,089	-4,345	-6,660	-8,938	-11,122	-13,070	-14,862	-16,514	-18,024	-19,421	25.2%
< 100 Employees	-3,733	-7,750	-11,843	-15,866	-19,721	-23,151	-26,310	-29,216	-31,882	-34,346	44.6%
< 500 Employees	-4,926	-10,309	-15,760	-21,098	-26,197	-30,729	-34,904	-38,733	-42,248	-45,502	59.1%
All Firms	-8,344	-17,856	-27,283	-36,367	-44,972	-52,550	-59,507	-65,851	-71,665	-77,039	100.0%

Table 11: Employment Difference from Baseline (Number of Employees) under HB 1039, Four Percent Cost-of-Living Adjustment Path

Firm Size	2014	2015	2016	2017	2018	2019	2020	2021	2022	2023	Percent of Total (2023)
1-4 Employees	-661	-1,447	-2,318	-3,246	-4,205	-5,133	-6,041	-6,932	-7,794	-8,636	7.8%
5-9 Employees	-660	-1,440	-2,305	-3,223	-4,172	-5,083	-5,989	-6,872	-7,739	-8,578	7.8%
10-19 Employees	-768	-1,681	-2,710	-3,799	-4,921	-6,014	-7,088	-8,149	-9,180	-10,185	9.2%
20-99 Employees	-1,644	-3,580	-5,723	-7,993	-10,334	-12,602	-14,841	-17,038	-19,181	-21,286	19.3%
100-499 Employees	-1,193	-2,688	-4,312	-6,025	-7,791	-9,483	-11,159	-12,795	-14,396	-15,957	14.5%
500 + Employees	-3,418	-7,923	-12,709	-17,662	-22,699	-27,498	-32,233	-36,823	-41,299	-45,676	41.4%
< 20 Employees	-2,089	-4,568	-7,333	-10,268	-13,298	-16,230	-19,118	-21,953	-24,713	-27,399	24.8%
< 100 Employees	-3,733	-8,148	-13,056	-18,261	-23,632	-28,832	-33,959	-38,991	-43,894	-48,685	44.1%
< 500 Employees	-4,926	-10,836	-17,368	-24,286	-31,423	-38,315	-45,118	-51,786	-58,290	-64,642	58.6%
All Firms	-8,344	-18,759	-30,077	-41,948	-54,122	-65,813	-77,351	-88,609	-99,589	-110,318	100.0%

Table 12: Real Output Difference from Baseline (Billions of 2005 \$) under HB 1039, Zero Percent Cost-of-Living Adjustment Path

Firm Size	2014	2015	2016	2017	2018	2019	2020	2021	2022	2023	Percent of Total (2023)
1-4 Employees	-\$0.056	-\$0.117	-\$0.172	-\$0.220	-\$0.260	-\$0.289	-\$0.310	-\$0.324	-\$0.333	-\$0.339	7.6%
5-9 Employees	-\$0.053	-\$0.111	-\$0.165	-\$0.211	-\$0.249	-\$0.276	-\$0.296	-\$0.310	-\$0.319	-\$0.324	7.3%
10-19 Employees	-\$0.058	-\$0.126	-\$0.189	-\$0.244	-\$0.288	-\$0.321	-\$0.344	-\$0.361	-\$0.371	-\$0.377	8.5%
20-99 Employees	-\$0.137	-\$0.289	-\$0.426	-\$0.541	-\$0.637	-\$0.704	-\$0.753	-\$0.785	-\$0.805	-\$0.815	18.3%
100-499 Employees	-\$0.112	-\$0.240	-\$0.352	-\$0.447	-\$0.522	-\$0.574	-\$0.611	-\$0.636	-\$0.649	-\$0.655	14.7%
500 + Employees	-\$0.331	-\$0.736	-\$1.080	-\$1.361	-\$1.581	-\$1.727	-\$1.828	-\$1.891	-\$1.925	-\$1.938	43.6%
< 20 Employees	-\$0.167	-\$0.354	-\$0.526	-\$0.675	-\$0.797	-\$0.886	-\$0.950	-\$0.995	-\$1.023	-\$1.040	23.4%
< 100 Employees	-\$0.304	-\$0.643	-\$0.952	-\$1.216	-\$1.434	-\$1.590	-\$1.703	-\$1.780	-\$1.828	-\$1.855	41.7%
< 500 Employees	-\$0.416	-\$0.883	-\$1.304	-\$1.663	-\$1.956	-\$2.164	-\$2.314	-\$2.416	-\$2.477	-\$2.510	56.4%
All Firms	-\$0.747	-\$1.619	-\$2.384	-\$3.024	-\$3.537	-\$3.891	-\$4.142	-\$4.307	-\$4.402	-\$4.448	100.0%

Table 13: Real Output Difference from Baseline (Billions of 2005 \$s) under HB 1039, Two Percent Cost-of-Living Adjustment Path

Firm Size	2014	2015	2016	2017	2018	2019	2020	2021	2022	2023	Percent of Total (2023)
1-4 Employees	-\$0.056	-\$0.123	-\$0.191	-\$0.258	-\$0.323	-\$0.380	-\$0.433	-\$0.482	-\$0.526	-\$0.569	7.4%
5-9 Employees	-\$0.053	-\$0.117	-\$0.183	-\$0.249	-\$0.310	-\$0.365	-\$0.416	-\$0.463	-\$0.507	-\$0.547	7.2%
10-19 Employees	-\$0.058	-\$0.133	-\$0.210	-\$0.286	-\$0.359	-\$0.425	-\$0.485	-\$0.540	-\$0.591	-\$0.638	8.3%
20-99 Employees	-\$0.137	-\$0.304	-\$0.472	-\$0.637	-\$0.794	-\$0.933	-\$1.061	-\$1.179	-\$1.288	-\$1.389	18.2%
100-499 Employees	-\$0.112	-\$0.252	-\$0.392	-\$0.527	-\$0.652	-\$0.763	-\$0.866	-\$0.959	-\$1.046	-\$1.127	14.7%
500 + Employees	-\$0.331	-\$0.773	-\$1.203	-\$1.607	-\$1.985	-\$2.313	-\$2.613	-\$2.888	-\$3.141	-\$3.379	44.2%
< 20 Employees	-\$0.167	-\$0.373	-\$0.584	-\$0.793	-\$0.992	-\$1.170	-\$1.334	-\$1.485	-\$1.624	-\$1.754	22.9%
< 100 Employees	-\$0.304	-\$0.677	-\$1.056	-\$1.430	-\$1.786	-\$2.103	-\$2.395	-\$2.664	-\$2.912	-\$3.143	41.1%
< 500 Employees	-\$0.416	-\$0.929	-\$1.448	-\$1.957	-\$2.438	-\$2.866	-\$3.261	-\$3.623	-\$3.958	-\$4.270	55.8%
All Firms	-\$0.747	-\$1.702	-\$2.651	-\$3.564	-\$4.423	-\$5.179	-\$5.874	-\$6.511	-\$7.099	-\$7.649	100.0%

Table 14: Real Output Difference from Baseline (Billions of 2005 \$s) under HB 1039, Four Percent Cost-of-Living Adjustment Path

Firm Size	2014	2015	2016	2017	2018	2019	2020	2021	2022	2023	Percent of Total (2023)
1-4 Employees	-\$0.056	-\$0.129	-\$0.210	-\$0.296	-\$0.386	-\$0.473	-\$0.561	-\$0.647	-\$0.732	-\$0.817	7.3%
5-9 Employees	-\$0.053	-\$0.123	-\$0.202	-\$0.286	-\$0.373	-\$0.457	-\$0.542	-\$0.625	-\$0.709	-\$0.790	7.1%
10-19 Employees	-\$0.058	-\$0.139	-\$0.232	-\$0.330	-\$0.430	-\$0.529	-\$0.627	-\$0.726	-\$0.823	-\$0.918	8.2%
20-99 Employees	-\$0.137	-\$0.318	-\$0.520	-\$0.735	-\$0.955	-\$1.170	-\$1.383	-\$1.595	-\$1.805	-\$2.013	18.1%
100-499 Employees	-\$0.112	-\$0.264	-\$0.430	-\$0.606	-\$0.787	-\$0.960	-\$1.133	-\$1.304	-\$1.474	-\$1.641	14.7%
500 + Employees	-\$0.331	-\$0.811	-\$1.324	-\$1.857	-\$2.403	-\$2.924	-\$3.444	-\$3.955	-\$4.461	-\$4.968	44.6%
< 20 Employees	-\$0.167	-\$0.391	-\$0.644	-\$0.912	-\$1.189	-\$1.459	-\$1.730	-\$1.998	-\$2.264	-\$2.525	22.7%
< 100 Employees	-\$0.304	-\$0.709	-\$1.164	-\$1.647	-\$2.144	-\$2.629	-\$3.113	-\$3.593	-\$4.069	-\$4.538	40.7%
< 500 Employees	-\$0.416	-\$0.973	-\$1.594	-\$2.253	-\$2.931	-\$3.589	-\$4.246	-\$4.897	-\$5.543	-\$6.179	55.4%
All Firms	-\$0.747	-\$1.784	-\$2.918	-\$4.110	-\$5.334	-\$6.513	-\$7.690	-\$8.852	-\$10.004	-\$11.147	100.0%

Simulation Results for a Minimum Wage Increase as Outlined in HB 1057

Assuming the implementation of HB 1057 in 2014:

- For a scenario with assumed future cost-of-living adjustments of zero percent, the BSIM forecasts that there will be 53,000 fewer jobs in 2023 due to the implementation of HB 1057 (**Table 15**). More than 59 percent of the jobs lost in this zero percent inflation scenario are in the small business sector. In addition, Pennsylvania gross domestic product is forecast to be \$5.2 billion less in 2023 compared to the baseline scenario (**Table 18**). The cumulative real output loss during the ten-year forecast window in this scenario totals \$37.8 billion.
- For a scenario with assumed annual future cost-of-living adjustments of two percent, the BSIM forecasts that there will be 85,000 fewer jobs in 2023 due to the implementation of HB 1057 (**Table 16**). Fifty-nine (59) percent of the jobs lost in this two percent inflation scenario are in the small business sector. In addition, Pennsylvania gross domestic product is forecast to be \$8.4 billion less in 2023 compared to the baseline scenario (**Table 19**). The cumulative real output loss during the ten-year forecast window in this scenario totals \$51.0 billion.
- For a scenario with assumed annual future cost-of-living adjustments of four percent, the BSIM forecasts that there will be 119,000 fewer jobs in 2023 due to the implementation of HB 1057 (**Table 17**). More than 58 percent of the jobs lost in this four percent inflation scenario are in the small business sector. In addition, Pennsylvania gross domestic product is forecast to be \$12.0 billion less in 2023 compared to the baseline scenario (**Table 20**). The cumulative real output loss during the ten-year forecast window in this scenario totals \$65.0 billion.

Table 15: Employment Difference from Baseline (Number of Employees) under HB 1057, Zero Percent Cost-of-Living Adjustment Path

Firm Size	2014	2015	2016	2017	2018	2019	2020	2021	2022	2023	Percent of Total (2023)
1-4 Employees	-762	-1,512	-2,198	-2,798	-3,304	-3,678	-3,964	-4,170	-4,316	-4,409	8.2%
5-9 Employees	-761	-1,503	-2,174	-2,758	-3,241	-3,597	-3,865	-4,058	-4,192	-4,274	8.0%
10-19 Employees	-887	-1,759	-2,561	-3,254	-3,831	-4,254	-4,572	-4,797	-4,951	-5,048	9.4%
20-99 Employees	-1,906	-3,739	-5,394	-6,814	-7,990	-8,847	-9,484	-9,938	-10,241	-10,431	19.5%
100-499 Employees	-1,384	-2,817	-4,078	-5,147	-6,016	-6,640	-7,102	-7,420	-7,626	-7,751	14.5%
500 + Employees	-3,965	-8,325	-12,004	-15,003	-17,368	-18,990	-20,136	-20,886	-21,331	-21,548	40.3%
< 20 Employees	-2,410	-4,774	-6,933	-8,810	-10,376	-11,529	-12,401	-13,025	-13,459	-13,731	25.7%
< 100 Employees	-4,316	-8,513	-12,327	-15,624	-18,366	-20,376	-21,885	-22,963	-23,700	-24,162	45.2%
< 500 Employees	-5,700	-11,330	-16,405	-20,771	-24,382	-27,016	-28,987	-30,383	-31,326	-31,913	59.7%
All Firms	-9,665	-19,655	-28,409	-35,774	-41,750	-46,006	-49,123	-51,269	-52,657	-53,461	100.0%

Table 16: Employment Difference from Baseline (Number of Employees) under HB 1057, Two Percent Cost-of-Living Adjustment Path

Firm Size	2014	2015	2016	2017	2018	2019	2020	2021	2022	2023	Percent of Total (2023)
1-4 Employees	-762	-1,582	-2,410	-3,216	-3,979	-4,656	-5,269	-5,826	-6,331	-6,795	8.0%
5-9 Employees	-761	-1,574	-2,393	-3,186	-3,935	-4,591	-5,189	-5,734	-6,229	-6,682	7.9%
10-19 Employees	-887	-1,843	-2,813	-3,755	-4,652	-5,433	-6,147	-6,792	-7,380	-7,916	9.3%
20-99 Employees	-1,906	-3,919	-5,935	-7,885	-9,723	-11,343	-12,813	-14,142	-15,356	-16,469	19.4%
100-499 Employees	-1,384	-2,951	-4,486	-5,950	-7,328	-8,527	-9,618	-10,598	-11,488	-12,304	14.5%
500 + Employees	-3,965	-8,711	-13,216	-17,411	-21,277	-24,578	-27,556	-30,217	-32,616	-34,805	41.0%
< 20 Employees	-2,410	-4,999	-7,616	-10,157	-12,566	-14,680	-16,605	-18,352	-19,940	-21,393	25.2%
< 100 Employees	-4,316	-8,918	-13,551	-18,042	-22,289	-26,023	-29,418	-32,494	-35,296	-37,862	44.6%
< 500 Employees	-5,700	-11,869	-18,037	-23,992	-29,617	-34,550	-39,036	-43,092	-46,784	-50,166	59.0%
All Firms	-9,665	-20,580	-31,253	-41,403	-50,894	-59,128	-66,592	-73,309	-79,400	-84,971	100.0%

Table 17: Employment Difference from Baseline (Number of Employees) under HB 1057, Four Percent Cost-of-Living Adjustment Path

Firm Size	2014	2015	2016	2017	2018	2019	2020	2021	2022	2023	Percent of Total (2023)
1-4 Employees	-762	-1,648	-2,617	-3,633	-4,664	-5,645	-6,604	-7,528	-8,424	-9,286	7.8%
5-9 Employees	-761	-1,646	-2,610	-3,613	-4,633	-5,608	-6,555	-7,482	-8,372	-9,238	7.8%
10-19 Employees	-887	-1,929	-3,068	-4,260	-5,474	-6,634	-7,772	-8,874	-9,940	-10,975	9.2%
20-99 Employees	-1,906	-4,098	-6,483	-8,964	-11,498	-13,907	-16,269	-18,553	-20,780	-22,945	19.3%
100-499 Employees	-1,384	-3,078	-4,890	-6,765	-8,666	-10,470	-12,229	-13,938	-15,586	-17,197	14.5%
500 + Employees	-3,965	-9,097	-14,429	-19,853	-25,284	-30,381	-35,345	-40,125	-44,752	-49,244	41.4%
< 20 Employees	-2,410	-5,223	-8,295	-11,506	-14,771	-17,887	-20,931	-23,884	-26,736	-29,499	24.8%
< 100 Employees	-4,316	-9,321	-14,778	-20,470	-26,269	-31,794	-37,200	-42,437	-47,516	-52,444	44.1%
< 500 Employees	-5,700	-12,399	-19,668	-27,235	-34,935	-42,264	-49,429	-56,375	-63,102	-69,641	58.6%
All Firms	-9,665	-21,496	-34,097	-47,088	-60,219	-72,645	-84,774	-96,500	-107,854	-118,885	100.0%

Table 18: Real Output Difference from Baseline (Billions of 2005 \$) under HB 1057, Zero Percent Cost-of-Living Adjustment Path

Firm Size	2014	2015	2016	2017	2018	2019	2020	2021	2022	2023	Percent of Total (2023)
1-4 Employees	-\$0.065	-\$0.135	-\$0.200	-\$0.256	-\$0.302	-\$0.335	-\$0.359	-\$0.376	-\$0.387	-\$0.393	7.6%
5-9 Employees	-\$0.061	-\$0.129	-\$0.192	-\$0.245	-\$0.289	-\$0.321	-\$0.344	-\$0.360	-\$0.370	-\$0.376	7.3%
10-19 Employees	-\$0.068	-\$0.147	-\$0.220	-\$0.283	-\$0.335	-\$0.373	-\$0.401	-\$0.419	-\$0.431	-\$0.438	8.5%
20-99 Employees	-\$0.159	-\$0.335	-\$0.494	-\$0.630	-\$0.740	-\$0.819	-\$0.875	-\$0.913	-\$0.936	-\$0.948	18.3%
100-499 Employees	-\$0.129	-\$0.279	-\$0.409	-\$0.519	-\$0.607	-\$0.668	-\$0.711	-\$0.740	-\$0.755	-\$0.763	14.8%
500 + Employees	-\$0.384	-\$0.856	-\$1.257	-\$1.583	-\$1.838	-\$2.009	-\$2.126	-\$2.200	-\$2.240	-\$2.254	43.6%
< 20 Employees	-\$0.194	-\$0.411	-\$0.612	-\$0.784	-\$0.926	-\$1.029	-\$1.104	-\$1.155	-\$1.188	-\$1.207	23.3%
< 100 Employees	-\$0.353	-\$0.746	-\$1.106	-\$1.414	-\$1.666	-\$1.848	-\$1.979	-\$2.068	-\$2.124	-\$2.155	41.7%
< 500 Employees	-\$0.482	-\$1.025	-\$1.515	-\$1.933	-\$2.273	-\$2.516	-\$2.690	-\$2.808	-\$2.879	-\$2.918	56.4%
All Firms	-\$0.866	-\$1.881	-\$2.772	-\$3.516	-\$4.111	-\$4.525	-\$4.816	-\$5.008	-\$5.119	-\$5.172	100.0%

Table 19: Real Output Difference from Baseline (Billions of 2005 \$s) under HB 1057, Two Percent Cost-of-Living Adjustment Path

Firm Size	2014	2015	2016	2017	2018	2019	2020	2021	2022	2023	Percent of Total (2023)
1-4 Employees	-\$0.065	-\$0.142	-\$0.219	-\$0.294	-\$0.365	-\$0.428	-\$0.485	-\$0.537	-\$0.584	-\$0.628	7.4%
5-9 Employees	-\$0.061	-\$0.135	-\$0.211	-\$0.284	-\$0.352	-\$0.412	-\$0.467	-\$0.516	-\$0.562	-\$0.604	7.1%
10-19 Employees	-\$0.068	-\$0.154	-\$0.242	-\$0.327	-\$0.408	-\$0.479	-\$0.543	-\$0.602	-\$0.655	-\$0.705	8.3%
20-99 Employees	-\$0.159	-\$0.350	-\$0.542	-\$0.727	-\$0.900	-\$1.052	-\$1.190	-\$1.315	-\$1.430	-\$1.536	18.2%
100-499 Employees	-\$0.129	-\$0.291	-\$0.449	-\$0.599	-\$0.740	-\$0.861	-\$0.971	-\$1.071	-\$1.161	-\$1.246	14.7%
500 + Employees	-\$0.384	-\$0.894	-\$1.381	-\$1.835	-\$2.253	-\$2.608	-\$2.931	-\$3.221	-\$3.485	-\$3.729	44.1%
< 20 Employees	-\$0.194	-\$0.431	-\$0.672	-\$0.905	-\$1.125	-\$1.319	-\$1.495	-\$1.655	-\$1.801	-\$1.937	22.9%
< 100 Employees	-\$0.353	-\$0.781	-\$1.214	-\$1.632	-\$2.025	-\$2.371	-\$2.685	-\$2.970	-\$3.231	-\$3.473	41.1%
< 500 Employees	-\$0.482	-\$1.072	-\$1.663	-\$2.231	-\$2.765	-\$3.232	-\$3.656	-\$4.041	-\$4.392	-\$4.719	55.9%
All Firms	-\$0.866	-\$1.966	-\$3.044	-\$4.066	-\$5.018	-\$5.840	-\$6.587	-\$7.262	-\$7.877	-\$8.448	100.0%

Table 20: Real Output Difference from Baseline (Billions of 2005 \$s) under HB 1057, Four Percent Cost-of-Living Adjustment Path

Firm Size	2014	2015	2016	2017	2018	2019	2020	2021	2022	2023	Percent of Total (2023)
1-4 Employees	-\$0.065	-\$0.147	-\$0.238	-\$0.333	-\$0.430	-\$0.523	-\$0.615	-\$0.705	-\$0.794	-\$0.881	7.3%
5-9 Employees	-\$0.061	-\$0.141	-\$0.230	-\$0.322	-\$0.415	-\$0.506	-\$0.595	-\$0.683	-\$0.768	-\$0.852	7.1%
10-19 Employees	-\$0.068	-\$0.161	-\$0.263	-\$0.370	-\$0.480	-\$0.585	-\$0.690	-\$0.792	-\$0.891	-\$0.991	8.2%
20-99 Employees	-\$0.159	-\$0.365	-\$0.591	-\$0.825	-\$1.066	-\$1.293	-\$1.520	-\$1.740	-\$1.958	-\$2.174	18.1%
100-499 Employees	-\$0.129	-\$0.303	-\$0.489	-\$0.682	-\$0.876	-\$1.062	-\$1.243	-\$1.423	-\$1.596	-\$1.770	14.7%
500 + Employees	-\$0.384	-\$0.931	-\$1.505	-\$2.091	-\$2.681	-\$3.234	-\$3.779	-\$4.313	-\$4.839	-\$5.354	44.5%
< 20 Employees	-\$0.194	-\$0.449	-\$0.731	-\$1.025	-\$1.325	-\$1.614	-\$1.900	-\$2.180	-\$2.453	-\$2.724	22.7%
< 100 Employees	-\$0.353	-\$0.814	-\$1.322	-\$1.850	-\$2.391	-\$2.907	-\$3.420	-\$3.920	-\$4.411	-\$4.898	40.7%
< 500 Employees	-\$0.482	-\$1.117	-\$1.811	-\$2.532	-\$3.267	-\$3.969	-\$4.663	-\$5.343	-\$6.007	-\$6.668	55.5%
All Firms	-\$0.866	-\$2.048	-\$3.316	-\$4.623	-\$5.948	-\$7.203	-\$8.442	-\$9.656	-\$10.846	-\$12.022	100.0%

Simulation Results for a Minimum Wage Increase as Outlined in SB 326

Assuming the implementation of SB 326 in 2014:

- The scenario with assumed future cost-of-living adjustments of zero percent is trivial, since this is simply the baseline forecast in the BSIM. As such, the forecast changes in employment (**Table 21**) and real output (**Table 24**) as a consequence of implementing SB 326 in this inflation environment are both zero.
- For a scenario with assumed annual future cost-of-living adjustments of two percent, the BSIM forecasts that there will be 28,000 fewer jobs in 2023 due to the implementation of SB 326 (**Table 22**). More than 58 percent of the jobs lost in this two percent inflation scenario are in the small business sector. In addition, Pennsylvania gross domestic product is forecast to be \$2.8 billion less in 2023 compared to the baseline scenario (**Table 25**). The cumulative real output loss during the ten-year forecast window in this scenario totals \$11.2 billion.
- For a scenario with assumed annual future cost-of-living adjustments of four percent, the BSIM forecasts that there will be 57,000 fewer jobs in 2023 due to the implementation of SB 326 (**Table 23**). More than 58 percent of the jobs lost in this four percent inflation scenario are in the small business sector. In addition, Pennsylvania gross domestic product is forecast to be \$5.8 billion less in 2023 compared to the baseline scenario (**Table 26**). The cumulative real output loss during the ten-year forecast window in this scenario totals \$23.0 billion.

Table 21: Employment Difference from Baseline (Number of Employees) under SB 326, Zero Percent Cost-of-Living Adjustment Path

Firm Size	2014	2015	2016	2017	2018	2019	2020	2021	2022	2023	Percent of Total (2023)
1-4 Employees	0	0	0	0	0	0	0	0	0	0	N/A
5-9 Employees	0	0	0	0	0	0	0	0	0	0	N/A
10-19 Employees	0	0	0	0	0	0	0	0	0	0	N/A
20-99 Employees	0	0	0	0	0	0	0	0	0	0	N/A
100-499 Employees	0	0	0	0	0	0	0	0	0	0	N/A
500+ Employees	0	0	0	0	0	0	0	0	0	0	N/A
< 20 Employees	0	0	0	0	0	0	0	0	0	0	N/A
< 100 Employees	0	0	0	0	0	0	0	0	0	0	N/A
< 500 Employees	0	0	0	0	0	0	0	0	0	0	N/A
All Firms	0	0	0	0	0	0	0	0	0	0	N/A

Table 22: Employment Difference from Baseline (Number of Employees) under SB 326, Two Percent Cost-of-Living Adjustment Path

Firm Size	2014	2015	2016	2017	2018	2019	2020	2021	2022	2023	Percent of Total (2023)
1-4 Employees	0	-66	-198	-396	-642	-920	-1,227	-1,550	-1,883	-2,221	8.1%
5-9 Employees	0	-66	-196	-385	-622	-895	-1,192	-1,504	-1,835	-2,159	7.8%
10-19 Employees	0	-76	-225	-447	-726	-1,049	-1,403	-1,773	-2,156	-2,547	9.2%
20-99 Employees	0	-163	-484	-948	-1,535	-2,201	-2,933	-3,704	-4,498	-5,305	19.3%
100-499 Employees	0	-115	-360	-709	-1,153	-1,654	-2,203	-2,787	-3,380	-3,982	14.5%
500 + Employees	0	-341	-1,048	-2,069	-3,354	-4,796	-6,360	-7,993	-9,659	-11,342	41.2%
< 20 Employees	0	-208	-619	-1,228	-1,990	-2,864	-3,822	-4,827	-5,874	-6,927	25.1%
< 100 Employees	0	-371	-1,103	-2,176	-3,525	-5,065	-6,755	-8,531	-10,372	-12,232	44.4%
< 500 Employees	0	-486	-1,463	-2,885	-4,678	-6,719	-8,958	-11,318	-13,752	-16,214	58.8%
All Firms	0	-827	-2,511	-4,954	-8,032	-11,515	-15,318	-19,311	-23,411	-27,556	100.0%

Table 23: Employment Difference from Baseline (Number of Employees) under SB 326, Four Percent Cost-of-Living Adjustment Path

Firm Size	2014	2015	2016	2017	2018	2019	2020	2021	2022	2023	Percent of Total (2023)
1-4 Employees	0	-131	-398	-783	-1,275	-1,838	-2,459	-3,116	-3,797	-4,494	7.9%
5-9 Employees	0	-130	-390	-768	-1,250	-1,803	-2,408	-3,059	-3,739	-4,429	7.8%
10-19 Employees	0	-151	-451	-894	-1,461	-2,118	-2,838	-3,610	-4,413	-5,241	9.2%
20-99 Employees	0	-323	-967	-1,900	-3,087	-4,451	-5,956	-7,564	-9,232	-10,950	19.2%
100-499 Employees	0	-234	-719	-1,424	-2,325	-3,352	-4,489	-5,696	-6,951	-8,236	14.5%
500 + Employees	0	-675	-2,089	-4,161	-6,775	-9,738	-12,998	-16,434	-19,998	-23,640	41.5%
< 20 Employees	0	-412	-1,239	-2,445	-3,986	-5,759	-7,705	-9,785	-11,949	-14,164	24.9%
< 100 Employees	0	-735	-2,206	-4,345	-7,073	-10,210	-13,661	-17,349	-21,181	-25,114	44.1%
< 500 Employees	0	-969	-2,925	-5,769	-9,398	-13,562	-18,150	-23,045	-28,132	-33,350	58.5%
All Firms	0	-1,644	-5,014	-9,930	-16,173	-23,300	-31,148	-39,479	-48,130	-56,990	100.0%

Table 24: Real Output Difference from Baseline (Billions of 2005 \$s) under SB 326, Zero Percent Cost-of-Living Adjustment Path

Firm Size	2014	2015	2016	2017	2018	2019	2020	2021	2022	2023	Percent of Total (2023)
1-4 Employees	\$0.000	\$0.000	\$0.000	\$0.000	\$0.000	\$0.000	\$0.000	\$0.000	\$0.000	\$0.000	N/A
5-9 Employees	\$0.000	\$0.000	\$0.000	\$0.000	\$0.000	\$0.000	\$0.000	\$0.000	\$0.000	\$0.000	N/A
10-19 Employees	\$0.000	\$0.000	\$0.000	\$0.000	\$0.000	\$0.000	\$0.000	\$0.000	\$0.000	\$0.000	N/A
20-99 Employees	\$0.000	\$0.000	\$0.000	\$0.000	\$0.000	\$0.000	\$0.000	\$0.000	\$0.000	\$0.000	N/A
100-499 Employees	\$0.000	\$0.000	\$0.000	\$0.000	\$0.000	\$0.000	\$0.000	\$0.000	\$0.000	\$0.000	N/A
500 + Employees	\$0.000	\$0.000	\$0.000	\$0.000	\$0.000	\$0.000	\$0.000	\$0.000	\$0.000	\$0.000	N/A
< 20 Employees	\$0.000	\$0.000	\$0.000	\$0.000	\$0.000	\$0.000	\$0.000	\$0.000	\$0.000	\$0.000	N/A
< 100 Employees	\$0.000	\$0.000	\$0.000	\$0.000	\$0.000	\$0.000	\$0.000	\$0.000	\$0.000	\$0.000	N/A
< 500 Employees	\$0.000	\$0.000	\$0.000	\$0.000	\$0.000	\$0.000	\$0.000	\$0.000	\$0.000	\$0.000	N/A
All Firms	\$0.000	\$0.000	\$0.000	\$0.000	\$0.000	\$0.000	\$0.000	\$0.000	\$0.000	\$0.000	N/A

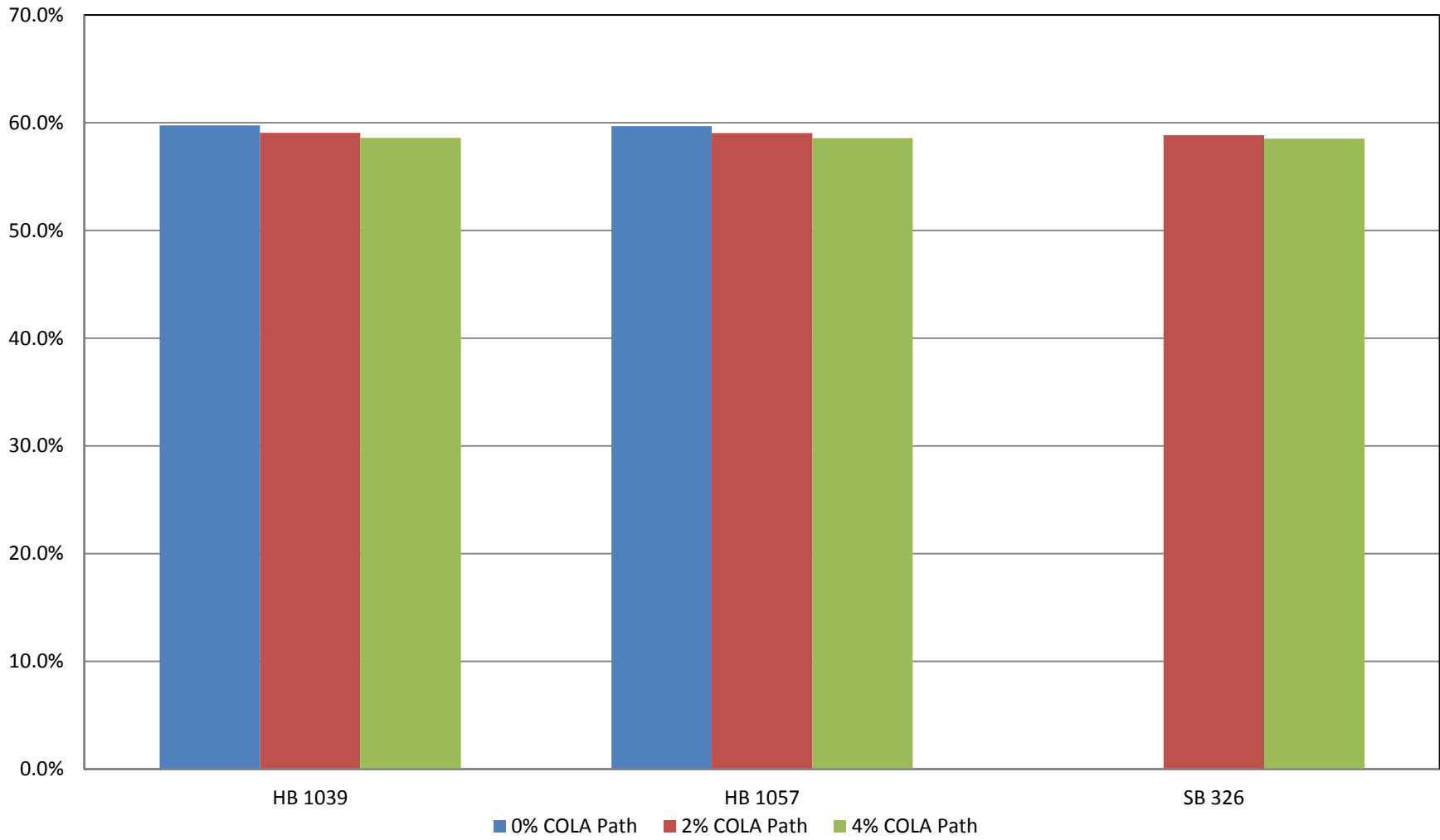
Table 25: Real Output Difference from Baseline (Billions of 2005 \$s) under SB 326, Two Percent Cost-of-Living Adjustment Path

Firm Size	2014	2015	2016	2017	2018	2019	2020	2021	2022	2023	Percent of Total (2023)
1-4 Employees	\$0.000	-\$0.006	-\$0.017	-\$0.034	-\$0.056	-\$0.081	-\$0.109	-\$0.139	-\$0.171	-\$0.203	7.3%
5-9 Employees	\$0.000	-\$0.005	-\$0.016	-\$0.033	-\$0.053	-\$0.078	-\$0.105	-\$0.133	-\$0.164	-\$0.195	7.1%
10-19 Employees	\$0.000	-\$0.006	-\$0.018	-\$0.037	-\$0.060	-\$0.089	-\$0.120	-\$0.153	-\$0.189	-\$0.225	8.1%
20-99 Employees	\$0.000	-\$0.013	-\$0.042	-\$0.084	-\$0.138	-\$0.200	-\$0.268	-\$0.342	-\$0.419	-\$0.498	18.0%
100-499 Employees	\$0.000	-\$0.011	-\$0.034	-\$0.069	-\$0.114	-\$0.164	-\$0.220	-\$0.281	-\$0.343	-\$0.406	14.7%
500 + Employees	\$0.000	-\$0.034	-\$0.107	-\$0.214	-\$0.350	-\$0.506	-\$0.676	-\$0.856	-\$1.043	-\$1.235	44.7%
< 20 Employees	\$0.000	-\$0.017	-\$0.051	-\$0.104	-\$0.169	-\$0.248	-\$0.334	-\$0.425	-\$0.524	-\$0.623	22.6%
< 100 Employees	\$0.000	-\$0.030	-\$0.093	-\$0.188	-\$0.307	-\$0.448	-\$0.602	-\$0.767	-\$0.943	-\$1.121	40.6%
< 500 Employees	\$0.000	-\$0.041	-\$0.127	-\$0.257	-\$0.421	-\$0.612	-\$0.822	-\$1.048	-\$1.286	-\$1.527	55.3%
All Firms	\$0.000	-\$0.075	-\$0.234	-\$0.471	-\$0.771	-\$1.118	-\$1.498	-\$1.904	-\$2.329	-\$2.762	100.0%

Table 26: Real Output Difference from Baseline (Billions of 2005 \$s) under SB 326, Four Percent Cost-of-Living Adjustment Path

Firm Size	2014	2015	2016	2017	2018	2019	2020	2021	2022	2023	Percent of Total (2023)
1-4 Employees	\$0.000	-\$0.011	-\$0.034	-\$0.068	-\$0.113	-\$0.165	-\$0.223	-\$0.286	-\$0.352	-\$0.421	7.3%
5-9 Employees	\$0.000	-\$0.010	-\$0.032	-\$0.065	-\$0.108	-\$0.158	-\$0.213	-\$0.274	-\$0.339	-\$0.406	7.0%
10-19 Employees	\$0.000	-\$0.011	-\$0.036	-\$0.073	-\$0.123	-\$0.181	-\$0.246	-\$0.317	-\$0.393	-\$0.472	8.2%
20-99 Employees	\$0.000	-\$0.026	-\$0.084	-\$0.169	-\$0.278	-\$0.406	-\$0.550	-\$0.705	-\$0.868	-\$1.039	18.0%
100-499 Employees	\$0.000	-\$0.021	-\$0.069	-\$0.140	-\$0.231	-\$0.335	-\$0.453	-\$0.579	-\$0.712	-\$0.851	14.7%
500 + Employees	\$0.000	-\$0.067	-\$0.212	-\$0.430	-\$0.710	-\$1.030	-\$1.386	-\$1.769	-\$2.172	-\$2.591	44.8%
< 20 Employees	\$0.000	-\$0.032	-\$0.102	-\$0.206	-\$0.344	-\$0.504	-\$0.682	-\$0.877	-\$1.084	-\$1.299	22.5%
< 100 Employees	\$0.000	-\$0.058	-\$0.186	-\$0.375	-\$0.622	-\$0.910	-\$1.232	-\$1.582	-\$1.952	-\$2.338	40.4%
< 500 Employees	\$0.000	-\$0.079	-\$0.255	-\$0.515	-\$0.853	-\$1.245	-\$1.685	-\$2.161	-\$2.664	-\$3.189	55.2%
All Firms	\$0.000	-\$0.146	-\$0.467	-\$0.945	-\$1.563	-\$2.275	-\$3.071	-\$3.930	-\$4.836	-\$5.780	100.0%

Small Business Share of Forecast Job Losses for All Nine Simulated Scenarios

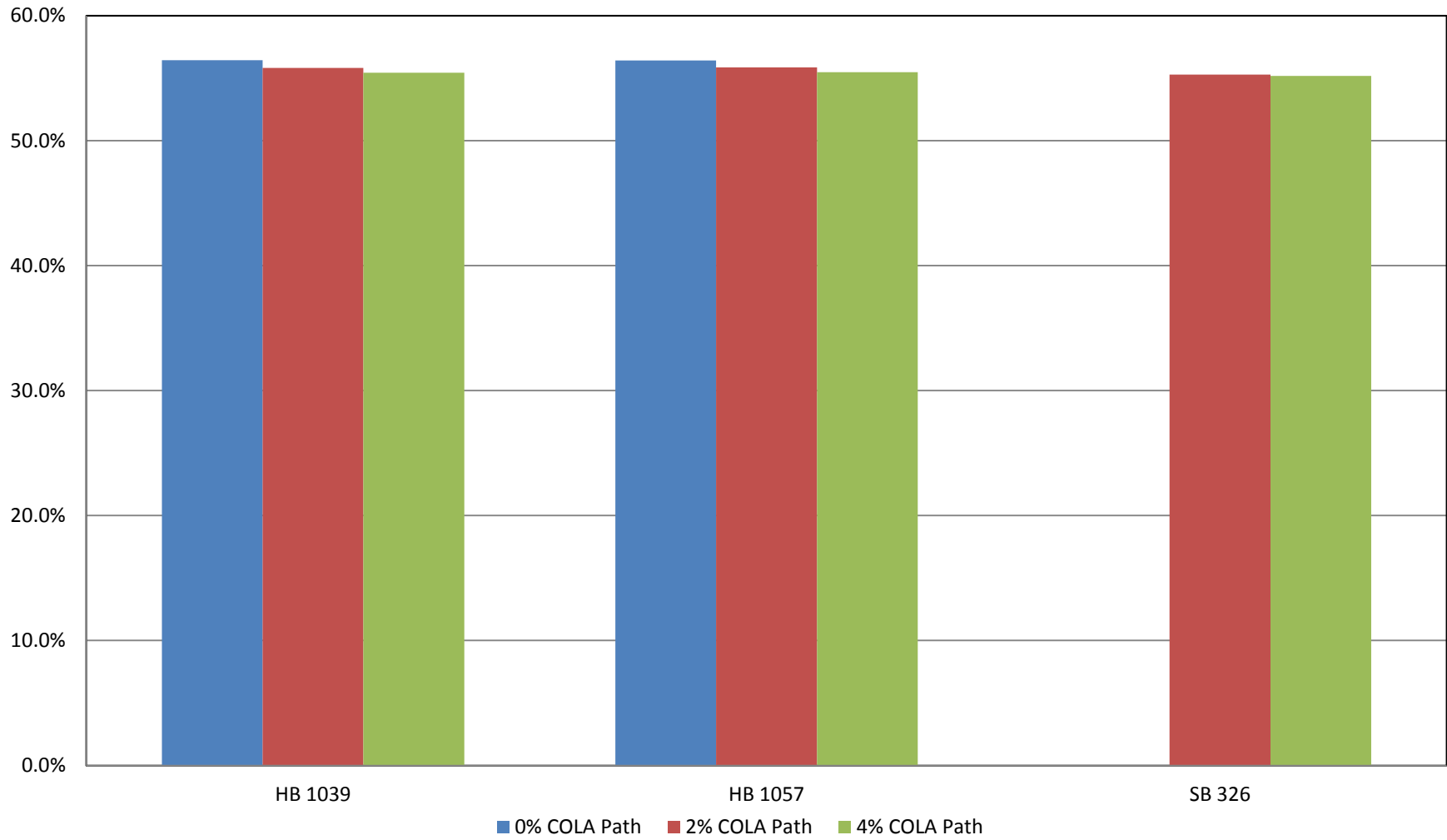


*No 0% COLA Path bar exists for SB 326 because that scenario is the same as the BSIM baseline forecast

**In all non-trivial simulated scenarios, small businesses bear a majority of the forecast job losses due to a minimum wage increase

Figure 1

Small Business Share of Forecast Real Output Losses for All Nine Simulated Scenarios



*No 0% COLA Path bar exists for SB 326 because that scenario is the same as the BSIM baseline forecast

**In all non-trivial simulated scenarios, small businesses bear a majority of the forecast real output losses due to a minimum wage increase

Figure 2

Jobs Lost (Magnitude of Employment Difference from Baseline) Over Time Due to Minimum Wage Increases

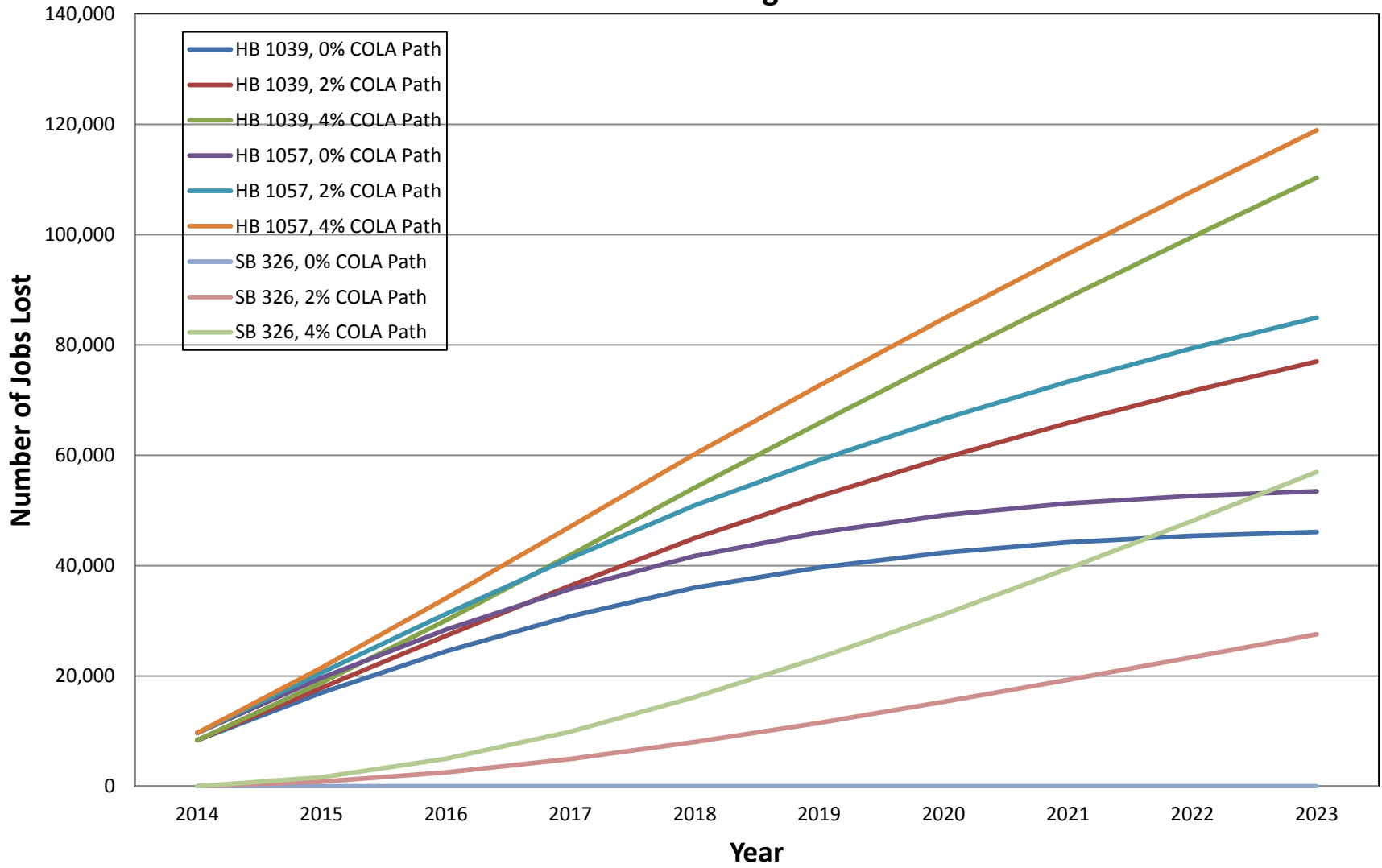


Figure 3

Cumulative Real Output Lost Over Time Due to Minimum Wage Increases

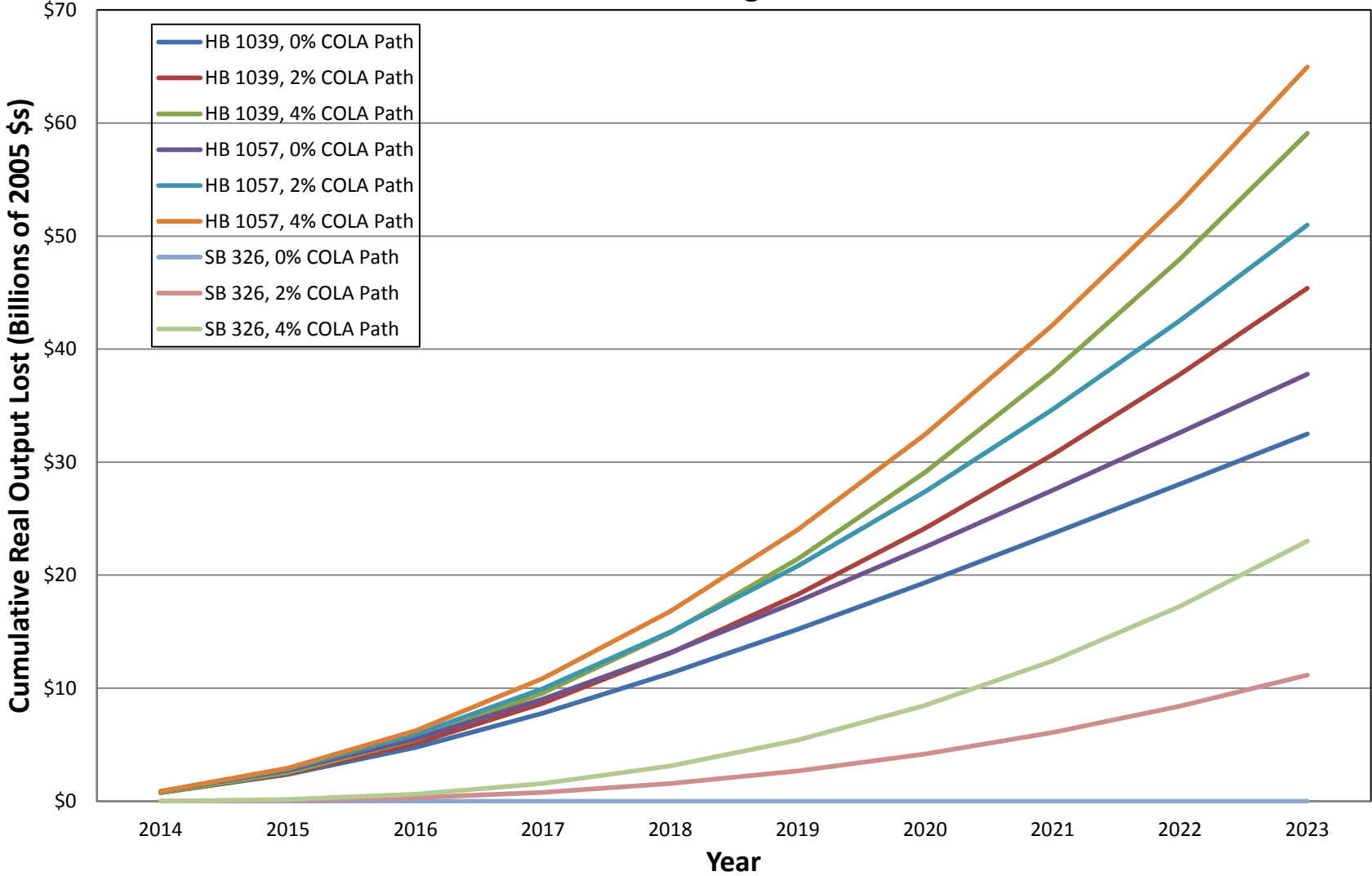


Figure 4

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.¹³ Card and Krueger 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."¹⁴

The motivation for Card and Krueger'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 Krueger'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 can be made about Card and Krueger'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."¹⁵ 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,

¹³ 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.

¹⁴ 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.

¹⁵ 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").¹⁶ 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."¹⁷ 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

¹⁶ 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.

¹⁷ Neumark, David, J.M. Ian Salas, and William Wascher, "Revisiting the Minimum Wage-Employment Debate: Throwing 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.¹⁸ 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.”

¹⁸ 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 17.