BENEFITS OF SLOWER HEALTH CARE COST GROWTH FOR MASSACHUSETTS EMPLOYEES AND EMPLOYERS

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EXECUTIVE SUMMARY

The relentless rise in health insurance premiums has become one of the greatest challenges facing Massachusetts employers and families. Premium increases continue to outpace growth in the economy and in personal income, straining both businesses and households.

Economists have long pointed out that the rapidly rising costs of employer-sponsored health insurance (ESI) have led to slower wage growth in the U.S. and, for some employers, pressure to eliminate jobs or lower business profitability. That these general labor market pressures exist is widely accepted by researchers, but there has been little analysis of their magnitude in Massachusetts.

Using a simulation model of Massachusetts businesses, this study estimates the impact of reducing health care cost growth on total employer health spending and employee wages, and on workforce investments and employer profitability. The results are clear: bringing health insurance premium growth more in line with general inflation would result in significant gains for the employers, workers, and citizens of the Commonwealth.

Among the findings of the report are:

- **The rapidly escalating costs of ESI are a genuine threat to Massachusetts businesses and workers.** Massachusetts employers spent $18.1 billion on ESI in 2010. If health care costs continue to grow at the projected rate of 6% per year, that amount will rise to $33.1 billion a year by 2019. Even this scenario may be overoptimistic, however, as private premiums for ESI have actually grown in Massachusetts at an average annual rate of 8% since 2001.
  - Employers are projected to spend some $237 billion on ESI over 2011–2019 if there is no policy change.
- **ESI premium growth will erode workers' earnings by billions of dollars each year.** If health insurance premiums grow at the currently projected annual rate of 6%, Massachusetts workers will lose around $17,000 per worker in overall take-home pay. This will be felt through both slower wage increases and higher employee health insurance premium contributions. In addition to these direct impacts on take-home pay, workers and their families will have to spend more on out-of-pocket costs as employers shift to less generous ESI coverage.
  - Workers are projected to lose $61 billion in compensation over 2011–2019 if there is no change to the current rate of health care cost growth.
- **Employers will incur billions in additional ESI costs that they cannot pass along to their workers through reducing or failing to raise wages.** Employers will be forced to either cut jobs or lower their profits in order to absorb the increased health premium costs they cannot pass on. In addition to the direct impact on jobs, blunted business profitability will affect the wider state economy through reductions in investment, shareholder payments, and state tax revenues.

- To offset the rising costs of ESI, employers will have to recoup more than $9 billion through layoffs or see their profits reduced by that much.

- **Even modest reductions in health insurance premium growth will yield major benefits to the wider Massachusetts economy.** Lowering the growth rate by just one percentage point, to 5% a year, over 2011–2019 would:
  - Reduce employer health spending by 3% — $10 billion in savings.
  - Preserve $7.8 billion in employee take-home pay — $2,000 per worker.
  - Preserve $1 billion for workforce investments and business profits.
- **Bringing premium growth down by two percentage points, to 4% per year, or about 0.5 percentage points above the projected per capita growth in the gross state product (GSP) would have even greater effects.** Reducing premium growth to 4% a year over 2011–2019 would:
  - Reduce employer spending on health insurance premiums by 9% — about $21.5 billion in savings.
  - Preserve $21 billion in employee take-home pay — $5,800 per worker.
  - Preserve $2.6 billion for workforce investments and business profits.
- **The most aggressive growth reduction scenario modeled in this report has health insurance premiums growing significantly more slowly than the economy, at 2%, or about 1.5 percentage points less than projected GSP. Here the benefits would be even more dramatic.** Reducing health care cost growth to this rate over 2011–2019 would:
  - Reduce employer spending on ESI by 15% — about $34.5 billion in savings.
  - Preserve $33.6 billion in take-home pay — about $9,200 per worker.
  - Preserve $4.1 billion for workforce investments and business profits.

Designing and implementing policies to control health care cost growth will not be easy. Successful policies, however, will have clear and sizable benefits for the state's labor market and economy. Without action, health insurance coverage will erode, workers' wages will stagnate, and employers will have fewer resources to invest in growing and strengthening the greater Massachusetts economy.

ESI PREMIUMS AND THE LABOR MARKET

The impact of rising health insurance premiums is felt in the state's labor market through several channels. Most directly, premium increases change the scope and nature of employer-sponsored health insurance (ESI). Rising premiums also cut into worker wages, the number of jobs in the state, and the profitability of Massachusetts companies.

Data and analysis from U.S. employer benefit surveys and other studies suggest that changes in health insurance premium prices will have four direct effects on ESI:

1. **How many employers choose to offer health insurance.** As premiums rise, fewer employers will choose to offer coverage. If premiums fall, in contrast, more employers will choose to offer insurance. The impact in either direction will be greater for small employers.[1]
2. **How much of the premium is paid by the employer and by the employee.** When premiums grow, employers will reduce the proportion of their contributions to health insurance and require employees to pay a larger share of the premium.[2] If premiums fall, employers that already offer insurance may reduce their employees' contributions to that insurance.
3. **What type of coverage is offered.** Rising premiums will lead employers to reduce the scope of health insurance benefits and/or increase the amount of out-of-pocket medical costs that employees must pay (i.e., deductibles, copayments, co-insurance).[3] If premiums fall, however, employers that already offer insurance may choose to buy more generous insurance.
4. **How many employees decide to take up health insurance offered by their employer.** If the contribution required to participate in the employer's insurance increases, some workers will decide to drop their coverage. If the required contribution falls, some employees who were previously declining ESI may decide to enroll.[4]

In addition to these direct changes in ESI, the economics literature shows that changes in health insurance premiums also affect worker wages, employment, and company profitability. Studies suggest that the primary way employers deal with rising health insurance costs is through lower wages or slower wage increases.[5] Labor market theory also suggests, though there is less direct evidence for this, that any effect should be symmetrical, such that lowered premiums would result in increased wages.

1 Jonathan Gruber and Michael Lettau (2004), "How Elastic Is the Firm's Demand for Health Insurance?," *Journal of Public Economics*, 88(7), July 2004, 1273-1294.

2 Jonathan Gruber and Robin McKnight (2003), "Why Did Employee Health Insurance Contributions Rise?," *Journal of Health Economics*, 22(6), November 2003, 1085-1104.

3 For a review of the literature on this, see Jonathan Gruber (2002), "Taxes and Health Insurance," in James Poterba, ed., *Tax Policy and the Economy 16*, Cambridge: MIT Press, 2002, 37-66.

4 Jonathan Gruber and Ebonya Washington (2005), "Subsidies to Employee Health Insurance Premiums and the Health Insurance Market," *Journal of Health Economics*, 24(2), March 2005, 253-276.

5 Jonathan Gruber (2001), "Health Insurance and the Labor Market," in Joseph Newhouse and Anthony Culyer, eds., *The Handbook of Health Economics*, Amsterdam: North Holland, 645-706.

Nonetheless, in practice most employers cannot completely shift costs to workers. Factors such as minimum wage laws, union contracts, and workplace norms make it difficult to pass along large health insurance increases fully to workers. Increases that cannot be fully shifted through wages are offset to the extent possible by laying off workers to reduce labor costs, or by changing the composition of the workforce to include more part-time workers who are not eligible for benefits.[6] [7] If those measures are not sufficient, some employers may have no choice but to absorb some of the increased health insurance costs in the form of lower profitability.

Deriving quantitative estimates of the overall net impact that reducing the future growth rate of health insurance premiums will have on employers and employees is complex, because many factors are at work simultaneously. If the growth rate of health insurance premiums falls, for example, and if nothing else changes, employer spending on health premiums will be lower. However, in the face of slower premium growth, employers are more likely to offer insurance, or they may increase their contribution to premiums or offer more generous benefits. Any of these changes would somewhat offset the savings from slower ESI premium growth that are presented here.

6 Katherine Baicker and Amitabh Chandra (2006), "The Labor Market Effects of Rising Health Insurance Premiums," *Journal of Labor Economics*, 24(3), July 2006, 609-634.

7 Katherine Baicker and Helen Levy (2007), "Employer Health Insurance Mandates and the Risk of Unemployment," NBER Working Paper 13528, October 2007, http://www.nber.org/papers/w13528.pdf

ESTIMATING THE EFFECTS OF REDUCING THE HEALTH INSURANCE PREMIUM GROWTH

This analysis uses the Gruber Microsimulation Model (GMSIM) to estimate the effects on Massachusetts employers and employees of moderating the growth in health insurance premiums. This model has been developed over the past 12 years to capture the response of employers and individuals to changes in the health insurance environment. GMSIM modeling was used in developing the Massachusetts 2006 health care reform law (Chapter 58) — first by Governor Romney's administration in developing its proposals, and then by the legislature as it considered alternative paths to translating those proposals into legislation. GMSIM has been used by other states including California, Connecticut, Delaware, Kansas, Michigan, Minnesota, Oregon, Vermont, and Wisconsin to estimate the effects of a variety of policy options. And it was used extensively by both the Obama administration and the U.S. Congress during the 2009–2010 debate over national health care reform.

GMSIM takes as its base data three years of pooled Current Population Survey (CPS) data, which is the national standard data set for defining insurance coverage. These data are matched to information on health insurance premiums and health costs. Data on the premiums for ESI and on the distribution of premiums between employers and employees come from the Medical Expenditure Panel Survey — Insurance Component (MEPS-IC), the nation's largest database of employer-provided insurance premiums. MEPS-IC provides information on employer premiums by state and employer size, the share of premiums covered by employers versus employees, and insurance take-up rates.

In addition to using Massachusetts-specific data regarding the ESI landscape, GMSIM was modified to reflect important state-level policies that shape and constrain employer and employee behavior in the face of rising health insurance premiums. The most important constraint in Massachusetts is the individual mandate to purchase minimum credible coverage, which is part of the state's 2006 health care reform law.

For a more detailed discussion of the GMSIM model and underlying data, please see Appendix B.

MAJOR ASSUMPTIONS USED IN DEVELOPING THE ESTIMATES

The GMSIM model, like most other simulation models, is based on evidence from the past. Thus a crucial assumption of the model is that changes in health insurance premiums will have the same effects on employer and employee actions, both overall and in terms of distribution, as have occurred historically. The model incorporates the best data and research on past responses of employers over a long time period, and we believe it provides reasonable estimates of future behavior.

The past, of course, is never a perfect predictor of the future. It is possible that increases in health insurance premiums could have different effects in the future, either because employers and employees make different decisions or because other economic and political forces come into play. As noted above, economists have found that employers historically responded to rising

health insurance costs by reducing or failing to increase wages. Owing to this body of research, the GMSIM model assumes that the "first" place excess health care costs go is into lower wages. The body of research that supports this assumption is based on relatively modest changes in benefit costs, however, not on the types of major changes modeled here. It is possible that employers would respond to more significant changes by focusing more on jobs and profits than we explore here. Thus the estimates in this paper should be viewed as indicating the *maximum* impact on wages but the *minimum* impact on jobs and profits.

Because there is little empirical evidence to suggest exactly how much employers will rely on layoffs versus reducing profits, the results for jobs and profits are presented as a single monetary estimate that represents the remaining excess costs employers cannot shift onto wages.

Importantly, this analysis does not attempt to quantify the effects that reducing health care cost growth would have on the health sector *per se.* It makes no assumptions regarding what policies would be implemented in order to achieve slower health care cost growth rates. Any impact on the Massachusetts health care sector would be determined by the nature of the cost-containment policies and how those policies ultimately translate into any changes in the health care workforce or profitability. Thus the figures reported here represent the *gross* impact on the Massachusetts economy of a reduction in the health care cost growth rate.

Baseline Assumption. In order to estimate the impact of moderating increases in health insurance premiums, we have developed an initial baseline scenario of future premium growth in the absence of policy change. We have then compared this baseline with the results of estimates that assume policy action will be taken to reduce health insurance premium growth. The baseline assumption is that total per capita health insurance costs will grow by 6% per year if there is no policy change. This rate of increase corresponds to the average annual rate of growth in ESI in Massachusetts since 2005.[8] It is also similar to the state's overall projected rate, 5.7%, of health care cost growth, which includes all health spending, both public and private, from 2010 to 2020.[9]

We also conducted a second set of analyses with a baseline scenario in which private health insurance premium costs grow at 8% annually — a rate that approximates the average annual growth rate in ESI premiums in Massachusetts since 2001.[10] Appendix A compares the two scenarios. Faster growth in the baseline trend magnifies all the outcomes — the increases in spending and wage losses absent policy intervention, and the benefits of controlling costs.

Three Targets for Reduced Health Insurance Premium Growth. For our comparison with the baseline, we estimated the impacts of three progressively lower rates of future premium growth:

8 Source: Authors' calculations from MEPS-IC data.

9 Massachusetts Division of Health Care Finance and Policy, "Massachusetts Health Care Cost Trends Historical (1991-2004) and Projected (2004-2010)," November 2009.

10 Source: Authors' calculations from MEPS-IC data.

- **Modest Growth Rate Reduction.** *A reduction in the annual growth rate of one percentage point.* Many health policy experts believe this is feasible given the cost-containment provisions of the federal Accountable Care Act.[11] This will be referred to as the **1-point reduction**.
- **Moderate Growth Rate Reduction.** *A reduction of two percentage points, to 4% a year.* Between 1975 and 2007, per capita health spending in the U.S. outpaced by nearly two percentage points per capita growth in the gross domestic product (GDP).[12] Per capita Massachusetts gross state product (GSP) tends to mirror per capita growth in the U.S. overall, and U.S. GDP is projected to grow between 2.9% and 3.9% per year over 2011–2019.[13] Therefore, this moderate case will be referred to as **GSP +0.5** percentage points, a target that experts consider achievable in Massachusetts.
- **Aggressive Growth Rate Reduction.** *A reduction of four percentage points, to 2%, a rate of growth significantly lower than the expected growth in the state's economy.* This scenario approximates per capita **GSP -1.5** percentage points, nearing the most aggressive targets that have been suggested in Massachusetts.

TABLE 1: COST GROWTH SCENARIOS

	6% ANNUAL GROWTH (BASELINE)	1-POINT REDUCTION (MODEST)	GSP +0.5 (MODERATE)	GSP -1.5 (AGGRESSIVE)
Annual Growth Rate in ESI Premiums	6%	5%	4%	2%
Cumulative Growth Rate 2010–2019	69%	55%	35%	14%
Difference from Baseline in Cumulative Growth Rate		14%	34%	55%

As Table 1 makes clear, the cumulative impact of future increases in health care costs will be substantial. Under the baseline scenario, total health care spending will have risen 69% by 2019. Reducing the rate of cost growth by even one percentage point would have a significant beneficial impact.

11 See, for example, David Cutler, Karen Davis, and Kristof Stremikis, "Health System Impacts of Health Reform Proposals," Commonwealth Fund and the Center for American Progress Action Fund, December 2009.

12 Congressional Budget Office, "The Long-Term Outlook for Medicare, Medicaid and Total Health Spending," December 2007.

13 While GSP growth rates may deviate from the national trends in the short term, over the long term state rates track closely with the overall national rate of economic growth. Average real per capita U.S. GDP is projected to grow at around 1.6% per year from 2011 to 2019, according to the authors' calculations from projections by the Congressional Budget Office and the U.S. Census. In an August 2011 update to "The Budget and Economic Outlook," the CBO projected that inflation in the Consumer Price Index will range from 1.3% to 2.3% over the period. Combined, the range of nominal per capita GDP growth is 2.9% to 3.9% over this period.

RESULTS

1. EMPLOYER SPENDING ON HEALTH INSURANCE

- At the currently projected growth rate of 6% a year, employer contributions to ESI premiums will rise from $18.1 billion to more than $33 billion in 2019. The cumulative spending on ESI over 2011–2019 will be an estimated $237 billion.
- If spending on ESI slowed, employers would save tens of billions of dollars over the coming decade. Even a modest one percentage point reduction in the rate of growth would result in significant savings. If the rate slowed to the growth in per capita GSP +0.5 points, the savings could be as much as $34.5 billion, and if growth slowed to GSP -1.5, the savings could be up to $54 billion.

Table 2 and Figure 1 show the impacts of the three reduced growth scenarios on total employer spending on ESI.

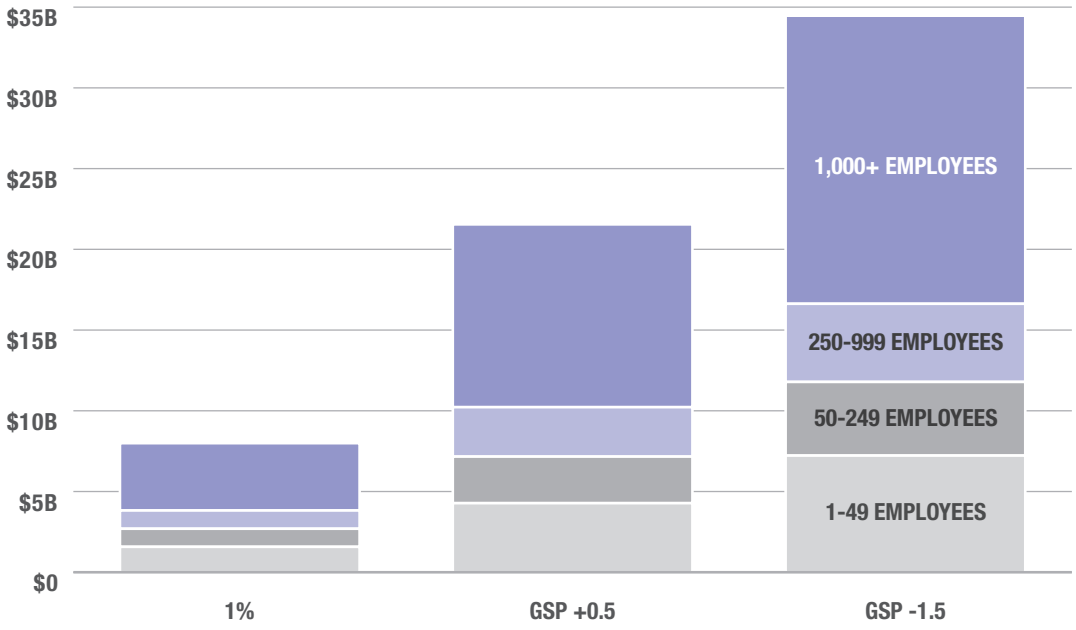
TABLE 2: EMPLOYER SPENDING ON ESI 2011–2019 UNDER DIFFERENT GROWTH RATE SCENARIOS ($ BILLIONS)

	NO REFORM	REFORM LEADING TO		
	BASELINE SPENDING AT 6% GROWTH RATE	1-POINT REDUCTION	GSP +0.5	GSP -1.5
CUMULATIVE ESI SPENDING 2011–2019				
Total	$236.8 billion	$228.8	$215.2	$202.3
Savings (Difference from Baseline)		$8.0	$21.5	$34.5
% Savings		3%	9%	15%

As Table 2 shows, if health insurance costs were to grow at an annual rate of 5% rather than 6% (modest cost containment), Massachusetts employers would save $8.0 billion over 2011–2019. If the rate of growth were reduced to per capita GSP +0.5 (moderate cost containment), employers would save $21.5 billion over the same period. Reducing the rate of growth to GSP -1.5 (aggressive cost containment) would enable employers to save $34.5 billion, 15% of their total spending on ESI.

As Figure 1 shows, employers of all sizes would achieve significant savings, with the greatest savings going to large employers, for two reasons. First, collectively they employ a disproportionately large number of workers. Second, they are more likely than small employers to offer insurance, and they tend to offer more generous benefits and pay a larger share of the premiums. Over 2011–2019, under the most aggressive cost-containment scenario, employers with 1,000 or more workers would save up to 16% of their currently projected spending, while employers with less than 50 workers would save up to 12%.

FIGURE 1: 2011–2019 EMPLOYER SAVINGS ON ESI



2. WORKER COMPENSATION

- The growth in premiums for ESI is eroding workers' earnings by billions of dollars each year.
- If health insurance premiums continue to increase by 6% per year throughout 2011–2019, workers in Massachusetts will lose a total of $61 billion in compensation.
- Slowing the rise in premiums would significantly moderate these earnings losses. If the rate of growth slowed to per capita GSP +0.5, workers would receive $21 billion, or about $5,800 per employee, more in compensation. If premium growth slowed to GSP -1.5, they would receive up to $33.6 billion, or about $9,200 per employee, more.

Employers view their labor costs in terms of total employee compensation, which is the sum of wages and all spending on benefits. The economics literature shows that employers tend to respond to rising health insurance costs by cutting wages and wage growth and/or by shifting some portion of health insurance costs to workers. Moderating the rate of increase in premiums is therefore likely to lead to higher overall take-home pay.

Table 3 and Figures 2 show the total amount of compensation workers would lose, as either lower absolute wages or increased contributions to their health insurance premiums, both of which reduce overall take-home pay. If health care costs grow at an annual rate of 6%, workers will be paid $61 billion less in wages and employer insurance contributions over 2011–2019.

TABLE 3: COMPENSATION LOSSES FROM RISING HEALTH INSURANCE SPENDING 2011–2019 UNDER DIFFERENT GROWTH RATE SCENARIOS ($ BILLIONS)

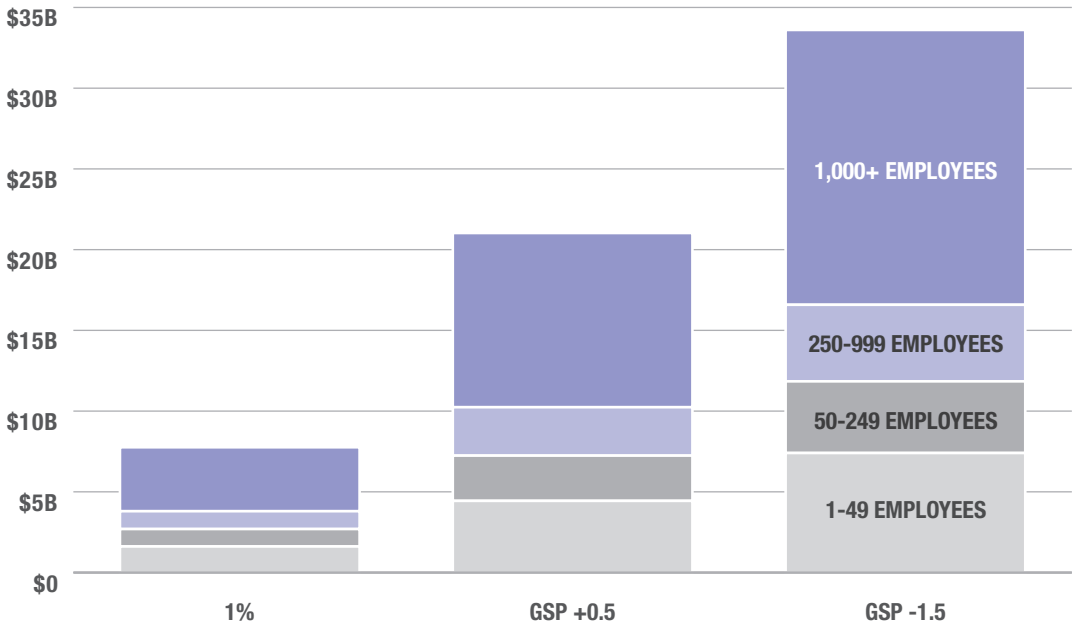
	NO REFORM	REFORM LEADING TO		
	BASELINE 6% GROWTH RATE	1-POINT REDUCTION	GSP +0.5	GSP -1.5
CUMULATIVE COMPENSATION LOSSES FROM RISING HEALTH INSURANCE PREMIUMS 2011–2019				
Total Compensation Loss	$61.2 billion	$53.4	$40.2	$27.6
Savings (Difference from Baseline)		$7.8	$21.0	$33.6
% of Lost Compensation Saved		13%	34%	55%

Moderating the rise in health insurance spending would significantly diminish the loss suffered by workers, yielding higher overall compensation. Reducing annual cost growth by one percentage point would save Massachusetts employees $1.9 billion in wages and insurance contributions in 2019 alone, or 18% compared with the baseline. The cumulative gains in compensation would be nearly $8 billion — more than $2,000 per worker. A reduction in growth to per capita GSP +0.5 would save $4.9 billion in compensation in 2019 alone, or about $21 billion over the decade — about $5,800 per worker.

The most aggressive savings assumption, reducing health care cost growth to GSP -1.5, would save Massachusetts workers $7.9 billion in lost compensation in 2019 and $33.6 billion over the

decade, restoring more than half the wages that would otherwise be lost to rising health insurance costs. Under this scenario, a typical Massachusetts worker would take home an additional $9,200 over 2011–2019.

FIGURE 2: 2011–2019 EMPLOYEE COMPENSATION SAVED



Employees of large organizations would reap the greatest total dollar savings, because large organizations employ so many Massachusetts residents and they tend to be generous with their ESI benefits and contributions. Proportionally, however, the benefits are similar for workers across business sizes, with those in large and medium-sized organizations recouping 13% to 57% of lost compensation compared with the baseline case, and workers at organizations with less than 50 employees recouping 11% to 50%.

3. JOBS AND BUSINESS PROFITS

- Employers cannot shift the full cost increases in health insurance premiums onto wages. They will therefore either recoup some costs through laying off workers or see a reduction in profits.
- Over 2011–2019, if there is no policy change, health insurance premium growth will force Massachusetts employers to offset an additional $9 billion in costs either by cutting jobs or by slashing profits.
- A loss of jobs has wider impacts, and lower profits affect the state's economy by reducing investment, payments to shareholders, and state tax revenues, among other things.
- Moderating cost growth to the same rate as overall inflation (GSP -1.5) could save up to $4.1 billion for reinvestment in the Massachusetts workforce or businesses, or for profits.

Table 4 and Figure 3 show the total monetary impact of layoffs or reduced business profits if health care costs continue to grow at their current rate, versus the three reduced cost growth scenarios. Over 2011–2019, as shown, employers will shift an estimated loss of $9 billion through layoffs or decreased profits if there is no policy change.

TABLE 4: VALUE OF JOBS AND PROFITS LOST RESULTING FROM RISING ESI SPENDING 2011–2019

	NO REFORM	REFORM LEADING TO		
	BASELINE 6% GROWTH RATE	1-POINT REDUCTION	GSP +0.5	GSP -1.5
CUMULATIVE LOST PROFITS AND WORKFORCE INVESTMENTS 2011–2019				
Total Profits and Workforce Investment Lost by 2019	$9.0 billion	$8.0 billion	$6.4 billion	$4.9 billion
Employee Compensation Saved (Difference from Baseline)		$1 billion	$2.6 billion	$4.1 billion
% of Profits and Workforce Investment Saved		11%	29%	46%

Reducing health care cost growth would significantly lower this burden. A reduction in premium growth of one percentage point of GSP would save $1 billion that employers could either use to keep and hire workers or devote to profits and investments.

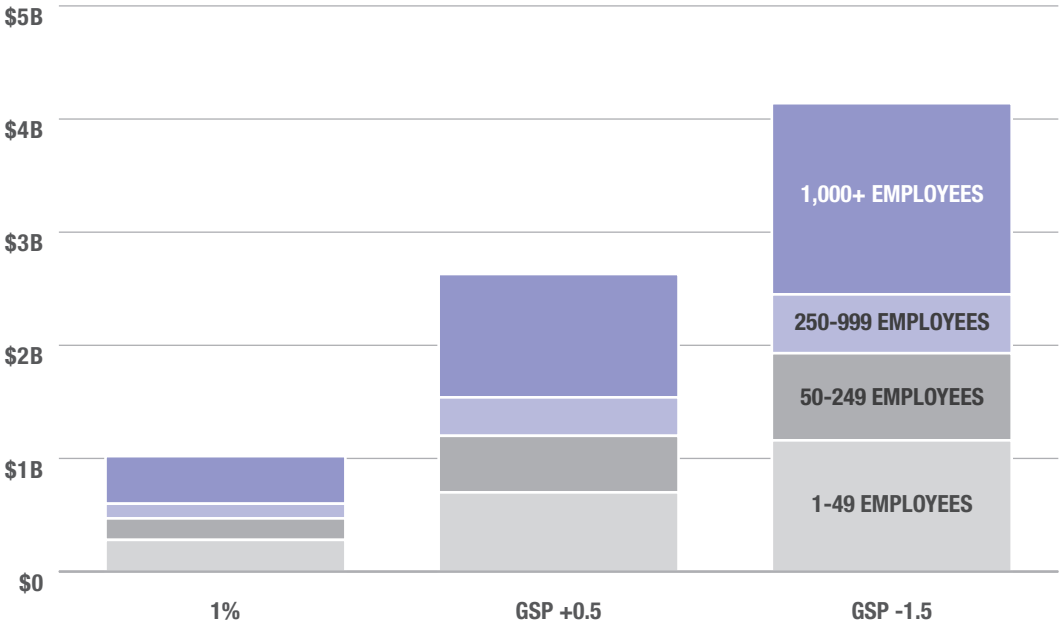
Reducing cost growth to half point higher than the per capita growth in the state's economy would save $2.6 billion compared with the baseline case. If the rate of spending growth were to slow to GSP -1.5, employers would save $4.1 billion.

As before, the largest employers would see the biggest benefit, but there would be significant gains across all business sizes. Depending on how aggressively health care costs were controlled, employers with 1,000 or more employees would save 13% to 52% of potentially lost workforce investments and profits, and those with less than 50 employees would save 9% to 36%.

As noted above, these figures represent the minimum impact on jobs and profits in Massachusetts. Employers have historically dealt with growing health care costs largely by reducing wage increases. But in the years ahead they may well turn increasingly to layoffs and blunted profits.

Again, these savings represent gross impacts on the overall economy and do not take into account any potential offsetting effects of jobs or profitability in the health care sector. The magnitude of such potential effects would be determined by the details of the cost-containment policies implemented and how those policies translate into changes in the health care workforce and profitability. This analysis makes no assumptions as to how health care costs will be lowered.

FIGURE 3: 2011–2019 CUMULATIVE PROFITS AND WORKFORCE INVESTMENTS SAVED



CONCLUSION

Rapidly escalating health insurance costs are a genuine threat to Massachusetts businesses and workers. Although rising health care spending may be a boon to the health care sector, it causes substantial harm to both employers and workers in the state as a whole. As this analysis shows, even under relatively conservative assumptions regarding the future growth in health insurance premiums, the harm to employers and workers is clear: employer spending on ESI will skyrocket, wages will suffer, unemployment will increase, and business profitability will decline.

Even modest reductions in health care spending growth would have dramatic positive effects on employers and workers. State and local governments, too, would benefit substantially from lower health insurance premium growth. Expenditures on their largest and fastest growing budget items would increase more slowly, and higher wages, employment, and corporate profits would generate more tax revenue.

Much is at stake in the current debate over health care costs. While designing and implementing policies to control increases in health insurance premiums and medical spending will not be easy, the resulting improvements in the state's labor market and in the health and vibrancy of the state's economy are well worth the struggle. Without strong action, health insurance coverage will erode, workers' wages will stagnate, and employers will have fewer resources to invest in growing and strengthening the Massachusetts workforce and economy for the opportunities and challenges of the 21st century.

APPENDIX A: 6% VS. 8% BASELINE

This appendix shows the changes projected to occur under the three health spending reform scenarios in relation to the 6% and 8% baselines. Since the future growth rate under the 1-point reduction cost-containment scenario depends by definition on the baseline, it will differ for the two baselines. Note, however, that the future growth rates under the per capita GSP +0.5 points and GSP -1.5 reform scenarios are the same for both baselines. Even so, total spending will differ because employers will see bigger savings under the 8% baseline, which will lead to larger indirect spending effects and thus raise the aggregate ex-post spending levels.

		REDUCTION OF GROWTH RATE TO				REDUCTION OF GROWTH RATE TO		
	BASELINE AT 6%	5% PER YEAR	GSP +0.5	GSP -1.5	BASELINE AT 8%	7% PER YEAR	GSP +0.5	GSP -1.5
CUMULATIVE ESI SPENDING 2011–2019 ($ BILLIONS)								
Total	$236.8 in additional spending	$228.8	$215.2	$202.3	$267.3 in additional spending	$258.2	$226.7	$213.5
Employer Savings on Health Spending (Difference from Baseline)		$8.0	$21.5	$34.5		$9.1	$40.5	$53.8
% Savings		3%	9%	15%		3%	15%	20%
CUMULATIVE COMPENSATION LOSSES FROM RISING HEALTH INSURANCE PREMIUMS 2011–2019 ($ BILLIONS)								
Total	$61.2 in compensation lost	$53.4	$40.2	$27.6	$86.7 in compensation lost	$78.0	$47.5	$34.7
Saved Employee Compensation (Difference from Baseline)		$7.8	$21.0	$33.6		$8.7	$39.1	$52.0
% Savings		13%	34%	55%		10%	45%	60%
LOST WAGES AND PROFITS FROM RISING HEALTH INSURANCE PREMIUMS 2011–2019 ($ BILLIONS)								
Total Financial Impact on Jobs and/or Profits	$9.0 in workforce investments & profits lost	$8.0	$6.4	$4.9	$13.4 in workforce investments & profits lost	$12.0	$8.0	$6.4
Profits Saved (Difference from Baseline)		$1.0	$2.6	4.1		$1.4	$5.4	$7.0
% of Lost Workforce Spending and Profits Saved		11%	29%	46%		10%	40%	53%

APPENDIX B: GMSIM TECHNICAL DOCUMENTATION

There are two major components to the Gruber Microsimulation Model (GMSIM): the "premod," which is the baseline data set, and the GMSIM model itself, which produces the simulation results.

The premod is primarily based on the 2005 Current Population Survey (CPS), which provides individual level data on about 40,000 non-elderly individuals and household units. The CPS for 2005 is used as the base data source because that is the latest year that respondents were asked about employer-sponsored insurance (ESI) offering. We use later-year versions of the CPS to update all income and demographic measures.

POPULATION DATA

In the CPS we are interested only in the non-elderly population (under age 65). Individuals aged 65 and older are primarily covered by the Medicare system and do not participate in traditional insurance markets; thus we exclude them from our simulation. We also exclude individuals covered through the TRICARE military health system, as they also do not participate in traditional insurance markets. The observations in the CPS are weighted such that one observation may represent many thousand people. For our analysis we begin by sorting people into four ex-ante insurance categories: ESI, nongroup, public, and uninsured. In the ex-ante state, the observation's entire weight is placed in one category. (When we run the simulation, we relax this assumption and allow weights to be spread across insurance categories.)

Finally, since the CPS groups households based on residence, which is not ideal for a health insurance simulation model, we create health insurance units (HIUs) to replace the CPS household definitions. These HIUs represent groups of people who would make insurance decisions together. Generally, spouses are grouped together and children are grouped with parents.

HEALTH EXPENDITURE AND PREMIUM DATA

The CPS lacks information on health expenditure or insurance premiums, so we supplement it with data from the Medical Expenditure Panel Survey (MEPS). MEPS gives us the distribution of individual annual expected health spending sorted by self-reported health status and age, which we then impute to our CPS observations and refer to as "truecost." To set ex-ante nongroup premiums, we first model actuarial value under the assumption that households will purchase higher value insurance as incomes rise. We then set premiums based on the individual's truecost, a fixed load, and a variable load that reflects the relative cost of the individual's age group. To set ESI premiums, we first model actuarial value based on the assumption that employers with higher average wages will provide higher value insurance. We then use MEPS data to impute the distribution of ESI premiums (both single and family plans) sorted by employer size. Premiums are adjusted by a health cost index that reflects the relative health of the employer's employees, employer size averages, and state averages. We use additional MEPS data to compute the

employer-employee split of the premium. We use data from the Kaiser Family Foundation to set public insurance program spending and eligibility, as well as the federal versus state funding split.

MODELING EMPLOYER BEHAVIOR

To model employer behavior, it is important to understand that employers make decisions based on the employer-wide aggregate effects of a policy. To mimic this in GMSIM, we construct "synthetic employers" that are meant to reflect the demographics of actual employers. The core of this computation comes from Bureau of Labor Statistics (BLS) data providing the earnings distribution of co-workers for individuals of any given earnings level, for various employer sizes and regions of the country. Using these data, we randomly select individuals in the same employer size/region/health insurance offering cell as a given CPS worker in order to statistically replicate the earnings distribution that the BLS data would predict for that worker. These workers then become the co-workers in a worker's synthetic employer.

To project our premod baseline data set forward for future-year analysis, we use a variety of income and health cost growth rates, population projections from the U.S. Census Bureau, and insurance growth rates from the Congressional Budget Office (CBO). We use CBO's projections for GDP growth to inflate income measures. We grow the overall population based on Census Bureau projections of population growth by age and sex. We also adjust the relative size of insurance categories using growth rates supplied by CBO.

To begin the policy simulation process, we first consider employer reactions to policy changes. We do this because 90% of private health insurance is provided by employers, giving them great influence in insurance markets. To model employer behavior, we assume that the employer's decision-making reflects the aggregation of worker characteristics and preferences. To model these preferences we compute "pseudo take-ups," which are the employer's prediction of worker reactions to policy changes. We then average these reactions across the employer. There are three ways that we allow employers to react to policy changes and their predictions of worker behavior: change in ESI offering, change in the premium contribution split, and change in the spending on the total ESI premium. We also consider the size of the employer, as small employer behavior is more sensitive to policy changes than large employer behavior. We assume that total worker compensation remains constant, so employers' increases in ESI spending are offset with wage reductions and decreases offset with wage increases.

Since the decision to offer insurance is the most direct method by which employers react to policy changes, we model changes in ESI offering by considering the incentives to offer insurance that different policies provide. We consider each policy component separately and compute an "offer pressure" that reflects the influence of the policy component on the employer's decision to offer or not offer insurance. Policies that provide viable alternatives to ESI coverage reduce the likelihood that an employer will offer ESI. For example, the introduction of individual exchanges or expansion of Medicaid reduces the likelihood that an employer offers insurance. Policies that subsidize alternative sources of insurance also reduce the likelihood that an employer will offer insurance. Subsidies or penalties for not offering insurance, in contrast, raise the likelihood that an employer will offer insurance. Any mandate policy will result in positive pressure to offer insurance. Because an individual mandate requires uninsured people to take up some form of insur-

ance, and because many workers or dependents of workers will prefer ESI to insurance of other types, a mandate policy will reduce the likelihood that the employer drops coverage.

Contribution and spending decisions are subtler methods for employers to influence worker behavior. We use a framework similar to employer offering when considering these decisions. In this process, we consider each policy component's impact on the contribution decision and the spending decision, and then aggregate the individual components to get the final contribution and spending change. Policies that provide or subsidize alternative forms of insurance will cause employers to reduce their contribution to the ESI premium and reduce spending on the premium. This indirectly influences workers to move to the alternatives. Conversely, when ESI is subsidized or employers are penalized for not providing coverage, employers will increase their contribution or spend more on the policy. When employers change their total spending on the ESI premium, half of the spending increase goes to purchasing a higher actuarial value product and half goes to buying unobservably better coverage (i.e., purchasing from a more reliable or higher reputation carrier).

MODELING THE RESPONSES OF INDIVIDUALS

After determining the employer response, we move on to estimate the reactions of individuals to the policy changes. When considering individual reactions, we use a hierarchy of insurance desirability in which ESI is most desirable, followed by individual exchanges, then traditional nongroup insurance, and finally (least desirable) public insurance. To decide among the various insurance options we use "take-up" equations to determine the probability that an individual will move to a certain insurance type. Generally speaking, these equations are of the form:

Take-up = (Constant + Elasticity x % Price Change x Income Effect) x Income Adjustment

The constant is a term that reflects the individual's health and the desirability of the insurance option. The elasticity determines the responsiveness of the individual to price changes. These are determined, to the greatest extent possible, by a survey of the health economics literature. The price change measures the change in price from the ex-ante state to the ex-post state, and is adjusted for changes in the actuarial value of the plan. The income effect measures the level of the price change relative to income. This is important because price changes have diminishing returns to movement. In other words, as the price change becomes larger in dollar terms, its impact on movement gets progressively weaker. The income effect also picks up the assumption that price changes become less important as income rises, as well as reflecting the assumption that take-up of insurance will fall as the final cost of insurance rises relative to income. After we compute the take-up probabilities for all the possible insurance movements, we apply any regulatory apparatus relevant to the insurance market being modeled. For example, individuals with an ESI offer may be legally barred from moving to the individual exchange. After making such regulatory changes, we adjust the probabilities for overlap such that the sum of the movement probabilities and the probability of remaining in the ex-ante insurance category equals 100%.

By this point we have predicted the probability of the individual making all possible insurance choices. We now relax the assumption that each individual observation can be in only one insurance type. We use the movement probabilities as the share of the individual's weight that is moved to the relevant insurance category. For example, an observation might have a total weight

of 1,000 and in the ex-ante state is uninsured. Ex-ante, we say this observation represents 1,000 uninsured individuals. Now in the ex-post world, we have concluded there is a 50% probability that this observation will continue to be uninsured, and a 50% probability that this observation will be covered by public insurance. We now say that this observation represents 500 uninsured individuals and 500 individuals covered by public insurance.

At this point we have computed what we call the voluntary movement—the movement that occurs as a result of individual and employer decisions. The next step is to apply any additional regulatory apparatus that affects movement, such as an individual mandate or an auto-enrollment process. To make these adjustments, we move a portion of the observation's ex-post uninsured weight to a predetermined insurance destination. The insurance destination represents the most likely source of insurance coverage for the person. The portion of the ex-post uninsured weight that is shifted depends on the insurance destination, and is calibrated to produce results in line with CBO estimates. We also have the capability to restrict the movement of undocumented immigrants. Using data provided by Dr. Jeffery Passel of the Pew Hispanic Center, we are able to identify likely undocumented immigrants in the data and adjust their movement.

FINALIZING COST CHANGES

Considering the regulatory apparatus is the last step in the movement section of the model. To conclude the modeling process, we finalize cost changes for individuals, employers, and governments. The first step in doing so is to reset premiums in any insurance exchanges that have been created. Exchanges will charge premiums that reflect the underlying risk of the overall pool instead of the individual, as in traditional nongroup markets. During the employer and individual reaction portion of the model, we estimate exchange premiums by using the existing nongroup and half of the existing uninsured population, selected randomly. After computing all movements, we reset the exchange premiums using the actual exchange population. Because of potential movement caused by this reset of exchange premiums, we originally iterated the employer and individual reactions until exchange populations stabilized. Over time, however, we have found that these iterations do not meaningfully change the exchange population, so we no longer iterate; but we do keep the reset exchange premiums. We then calculate changes for individuals in premiums, out-of-pocket spending, regulatory penalties, wages, and taxes. For employers we calculate changes in ESI spending, payroll taxes, and regulatory penalties. For governments, both state and federal, we calculate changes in public insurance spending, subsidies (both for individuals and employers), tax revenues, and revenues from regulatory penalties.