UCLA CENTER FOR HEALTH POLICY RESEARCH

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CalSIM
California Simulation of Insurance Markets

The California Simulation of Insurance Markets (CalSIM) model is designed to estimate the impacts of various elements of the Affordable Care Act on employer decisions to offer insurance coverage and individual decisions to obtain coverage in California. It was developed by the UC Berkeley Center for Labor Research and Education and the UCLA Center for Health Policy Research, with generous funding provided by The California Endowment.

California Simulation of Insurance Markets (CalSIM) Version 1.8

Methodology & Assumptions

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1 Introduction

The purpose of this report is to describe the data, methods, and assumptions used to develop the UC Berkeley Center for Labor Research and Education and UCLA Center for Health Policy Research *California Simulation of Insurance Markets* (CalSIM). CalSIM is a micro-simulation model designed to estimate the effects of specific aspects of the Affordable Care Act (ACA) on firm and individual behavior affecting insurance coverage in California. CalSIM is constructed using four main data sets: the 2004–2008 Medical Expenditure Panel Survey (MEPS) Household Component and the Person Round Plan data files, the 2009 California Health Interview Survey (CHIS), California Employment Development Department (EDD) 2007 analysis data, and the 2010 California Employer Health Benefits Survey (CEHBS). CHIS and CEHBS provide California-specific demographic, employment, and health information to supplement national MEPS data and form a model of firms and workers representative of California. Additionally, CalSIM incorporates immigration status into behavioral predictions to account for California's considerable immigrant population. Having constructed a final decision set, CalSIM simulates the coverage choices of employers to offer health insurance and individuals to take up in both private markets and public insurance programs. CalSIM thus produces California-centric estimates of insurance coverage resulting from ACA implementation, allowing detailed projections of insurance status among California's nonelderly population.

This report is structured as follows. Section 2 describes the features of the ACA central to CalSIM design, including those relevant to firm and individual behavior. Section 3 outlines the CalSIM general modeling approach, including flow diagrams of data construction and insurance coverage decisions. Section 4 presents the source data sets and methods of data construction, and Section 5 offers further technical details of the behavioral components and insurance coverage determination processes. Section 6 offers a discussion of the model limitations and next steps for future versions of the CalSIM model. Section 7 concludes with descriptions of previous version of CalSIM and their corresponding publications.

2 Summary of the Affordable Care Act

2.1 Core Aspects of the ACA Affecting Firm Behavior

Employer responsibilities for providing health coverage and penalties

Firms that employ 50 or more full-time equivalent non-seasonal employees are subject to the employer responsibility requirements in the ACA, which begin in 2014. If the employer does not offer coverage to employees and has at least one full-time employee receiving subsidies in the exchange, the firm is subject to a penalty of $2,000 per full-time employee (full-time is defined as 30 or more hours per week) in 2014, increasing subsequently by the ratio of insurance premium growth to cost of living inflation. The $2,000 penalty is not applied for the first 30 employees in a firm. Firms that offer coverage are subject to an annual penalty of $3,000 per full-time employee who receives tax credit subsidies in the Exchange due to ineligibility for their employer's plan, lack of affordable coverage (single-only policy is offered at greater than 9.5% of income), or if the employer's plan has an average actuarial value of less than 60 percent. Until 2016, firms with 50 employees or fewer can purchase coverage in the Small Business Health Options Program (SHOP) Exchange in California. In 2016, the ACA requires the inclusion of employers of 100 or fewer workers in the SHOP Exchange. Beginning in 2017, states will be allowed to open up the Exchange to larger employers. For workers taking-up employer coverage purchased through the Exchange, no federal subsidies will be provided. However, in these cases, employers are likely to contribute to premiums and the employees will be protected by the rules of the Exchange rather than the less restrictive rules that will continue to exist in the large group market outside of the Exchange.

Excise tax and its effects on employer-based plans

In 2018, a new provision of the ACA could impact the pricing of premiums for health insurance products offered by employers. An excise tax will be added to any premium offered by an employer that is $10,200 or more for an individual policy, or $27,500 for a family policy. This excise tax, known as "the Cadillac Tax" will effectively increase the price of the premium to the purchaser (the employer) who is likely to pass on the added cost to the consumer (employee) or try to avoid the tax by reducing the premium to below the threshold by changing benefits or cost sharing or making other adjustments to the plan. The excise tax will be calculated based on 40 percent of the amount of the premium that exceeds the $10,200 threshold in 2018. For example, if a person were offered a plan with an $11,000 premium, only $800 of the premium would be subject to the excise tax, making the total cost of the health insurance plan premiums $11,320. This calculation will only be made in modeling the 2019 scenario, by increasing the net employee contribution by 40 percent

of the difference between the total premium (employee and employer shares) and the threshold amount of $10,200 or $27,500, depending on the policy type.

Small business tax credits

The ACA provided tax credits to small businesses starting in 2010, in order to make health insurance more affordable to the segment of the employment-based market where coverage offer rates have historically been lower relative to the large-group market. Starting in the 2010 tax year, tax credits are available for small employers with 25 FTEs or fewer (where FTEs are defined as the total number of hours paid by the employer divided by 2,080 hours) and average wages of $50,000 or less:

- From 2010 to 2013, tax credits will be available for up to 35 percent of the employer's contribution, or 25 percent for non-profit firms;
- The maximum credit is available to firms with no more than 10 FTEs and average wages of $25,000 or less and is phased out as firm size and average wage increases;
- Starting in 2014, tax credits will be available for up to 50 percent for insurance purchased through the Exchange, or 35 percent for non-profit firms, but firms will only be eligible to receive the credit for two consecutive years.

As a result, existing firms could receive tax credits for up to six years (tax years 2010-2015), but after 2016, only new firms or firms that have not yet taken advantage of the credit for two years will qualify for the tax credit. However these firms would only be able to claim it for a maximum of two years.

2.2 Core Aspects of the ACA Affecting Individual Behavior

Individual mandate requirement for health insurance coverage and penalties

Starting on January 1, 2014, every U.S. Citizen and legal resident will be required to have qualified health insurance coverage through enrollment in Medicaid, Medicare, Children's Health Insurance Plan (CHIP), employer-based, or individually-purchased insurance plans. Those who do not obtain health insurance coverage will be penalized the greater of $95 or one percent of taxable income in 2014, $325 per person or two percent of taxable income in

2015, and $695 per person (up to a maximum of $2,085 per family) or 2.5 percent of taxable income in 2016, unless they meet specific exemption criteria.[1]

Health Benefit Exchange

In order to facilitate the purchase of insurance for individuals who are not offered insurance by their employers or do not have access to employer-based coverage due to self-employment, unemployment, or because the employer-offered premium is too expensive, the ACA encourages creation of regional or state-based Health Benefit Exchanges to serve as a marketplace for health insurance products. If states do not create their own exchange by 2013, the Department of Health and Human Services will operate their own exchange to provide a marketplace for the small businesses and individual purchasers who are not offered health insurance by their employers. The ACA allows for state exchanges to operate in parallel with the non-exchange small group and individual insurance market. However, the ACA requires the same rules to be followed in the non-exchange market and the exchange market. California's authorizing legislation (AB 1602/SB 900) introduced a higher standard for the small group and individual insurance markets that will operate in the state by going further than federal law in some regards. The California Health Benefit Exchange will:

1. Allow any employer with fewer than 100 employees to participate in the exchange.
2. Allow any legal resident or citizen of the U.S. living in California to purchase health insurance, although subsidies are only available to those who are income-eligible, are not eligible for other minimum essential coverage, including Medicare, Medi-Cal and Healthy Families, and are not offered affordable insurance by their employer or a family member's employer (under draft regulations, employees and their family members are ineligible for subsidies if employee contributions to job-based self-only coverage are less than 9.5 percent of household income, regardless of the cost of family coverage).
3. Require insurers to offer the same products outside of the Exchange that are sold inside of the Exchange. However, insurers could sell products outside of the Exchange only, but insurers not in the Exchange are required to offer at least one standardized product in each of the four levels of coverage offered in the Exchange.
4. Require insurers that offer a catastrophic plan to offer it in the Exchange and outside of the Exchange.

[1] In order to be exempted from the individual mandate requirement individuals and families must experience financial hardship (the plan premiums offered to them or available for purchase would cost more than 8 percent of Modified Adjusted Gross Income), have religious objections, be American Indians in federally recognized tribes, lack insurance coverage for less than three months, be incarcerated or an undocumented immigrant, or have incomes below the federal tax filing threshold.

5. Require insurers participating in the Exchange to sell products at every level of the four main actuarial value categories (Bronze, Silver, Gold, Platinum).

Until 2014 there is no guaranteed issue individual insurance market in the state for adults, though guaranteed issue insurance is available for children contingent on specific open enrollment periods. Additionally, premium pricing is not yet community rated as it will be in 2014. The ACA encourages high-risk purchasing pools to be created to allow consumers who have been without insurance for at least six months and who have been denied coverage by a commercial insurance plan, to buy a policy partially subsidized by the federal government through state-designed high-risk pools. In California, the Pre-Existing Condition Insurance Program (PCIP) fills this need and has enrolled over 5,000 individuals as of October 2011.

Premium and cost sharing subsidies for individuals

Employer-based insurance premiums continue to be excluded from taxable income for the employee and excluded from payroll tax for the employer after passage of the ACA. In the small group market, this is also the case, even if the employer purchases coverage on behalf of the employees in the new California Health Benefit Exchange. If an individual purchases their own coverage through the Exchange, they will be eligible for premium and cost-sharing subsidies depending on their income. These subsidies are based on the actuarial value and pricing of a silver plan. Premium subsidies can be applied to any plan in the exchange, but individuals must enroll in a silver plan to be eligible for cost sharing subsidies.

The premium subsidies are available in the form of advanced tax credits at the time of purchase. These subsidy levels are dictated by household income based on Modified Adjusted Gross Income (MAGI). The tax credit equals the amount that would be spent on premiums for a silver plan over the premium cap. In essence, the percentage thresholds act as a cap on premium spending.

Exhibit 1. Premium Caps After Income Based Premium Subsidies in the Exchange

MAGI as percentage of Federal Poverty Level	Lower Bound of Premium Cap (% of MAGI)	Upper Bound of Premium Cap (% of MAGI)
100 to 133%	2.0%	2.0%
134% to 150%	3.0%	4.0%
151% to 200%	4.0%	6.3%
201% to 250%	6.3%	8.05%
251% to 300%	8.05%	9.5%

301% to 400%	9.5%	9.5%
401% and over	Not Applicable	Not Applicable

Note: For lawful permanent residents earning less than 100% of FPL, their income is imputed to be 100% of FPL based on their family size due to a provision of the ACA.

The out-of-pocket cost sharing subsidies are also linked to household income of the beneficiaries, based on MAGI. The cost sharing subsidies are provided in the Exchange through payments to the insurers and consumer limits on out-of-pocket spending and reductions in other cost sharing amounts, rather than through the tax system. The subsidies are again linked to the silver plan's actuarial value of 70 percent, and increase the level of actuarial value based on household income. For example, if a family earning 133 percent of FPL has a silver plan with a 70 percent actuarial value, the cost-sharing subsidies received when using services would make their plan equivalent to a plan with a 94 percent actuarial value.

In the Exchange, cost sharing subsidies are provided to families who earn 400 percent of FPL or less. Specifically, out-of-pocket maximums are reduced for those who earn 400 percent of FPL or less and further reductions in cost sharing are made for those who earn 250 percent of FPL or less.

Although subsidies will only exist in the Exchange, a parallel insurance market outside of the Exchange could exist. This market will be required to sell the same products that are offered inside of the Exchange, and the insurers doing business outside of the Exchange will be required to abide by the same rules for Medical Loss Ratios, pooling of risk in and out of the Exchange, guaranteed issue, adjusted community rating, and other regulations designed to increase competition, protect consumers, and reduce premium prices.

Exhibit 2. Cost Sharing Subsidies in the Health Insurance Exchange

Household Income (MAGI as a Percentage of Federal Poverty Level)	Actuarial Value of Silver Plan after subsidies
0 to 150%	94%
151% to 200%	87%
200% to 250%	73%
251% to 400%	70%

Changes to standards of private insurance plans

The ACA requires the creation of an essential health benefits package that will serve as a standard for all health insurance plans offered for sale in the individual and small group markets in and out of the Exchange. Grandfathered plans are exempt from this requirement, as are employer-based (large group) plans. However, the essential health benefits package is supposed to cover similar benefits to a typical employer-based plan. The benefits outlined in the statute include:

1. Ambulatory Patient Services,
2. Emergency Services,
3. Maternity and Newborn Services,
4. Mental Health and Substance Abuse Services (including Behavioral Health Counseling and Treatment),
5. Prescription Drugs,
6. Rehabilitative Services and Devices,
7. Laboratory Services,
8. Preventive and Wellness Services,
9. Chronic Disease Management, and
10. Pediatric Services (including oral and vision care).

Recently, through the regulatory process, the Department of Health and Human Services has given states the flexibility to determine exactly which items and services will be included in an essential health benefits package. States can choose between one of the following benchmarks:

- One of the three largest small group plans in the state;
- One of the three largest state employee health plans;
- One of the three largest federal employee health plan options;
- The largest HMO plan offered in the state's commercial market.

In addition to the individual and small group market, the Medicaid expansion population (those who are not eligible for Medicaid prior to January 1, 2014 due to income, disability, family status, age, etc) will have access to Medicaid programs in their states that use the essential health benefits package as the standard, rather than the federal guidelines covering the Temporary Assistance for Needy Families (TANF) and Seniors and Persons with Disabilities (SPD) populations. The TANF/SPD groups who are already eligible for Medicaid will continue to receive services based on the benefit packages already existing in the state Medicaid program. The state will continue receiving federal matching based on a 50% Federal Medical Assistance Percentage for the TANF/SPD population, while the new

Medicaid expansion population will be subject to 100 percent federal match for the first three years (2014-2016), which will gradually be reduced to 90 percent matching by 2020.

Grandfathered plans

Health insurance plans or policies that were in effect on or before the date ACA was signed (March 23, 2010) are eligible to be grandfathered. Grandfathered plans are exempt from certain provisions of the law until they lose their grandfathered status as a result of making certain changes to plan design. Grandfathered plans are not required to offer first dollar coverage for preventive services, a standard effective in 2010 or 2011 for all other plans. Grandfathered plans are also not required to meet other provisions effective for other plans in 2014, including: complying with limits to out-of-pocket maximums, pricing plans based on adjusted community rating, complying with small group deductible limits and offering the essential benefits package.

However, grandfathered plans are subject to other requirements of the ACA starting in 2010, including:

- Eliminating of lifetime dollar limits on benefits;
- Eliminating rescissions;
- Eliminating waiting periods of more than 90 days;
- Eliminating annual dollar limits on benefits starting in 2014 (except in the individual market);
- Extending coverage to adult children up to age 26, regardless of financial dependency status (except for children receiving their own employment-based health insurance benefits); and
- Eliminating preexisting condition exclusions for children up to age 19, and for adults in 2014 (except in the individual market).

Because there are no reliable data on the prevalence of insurance products subject to these requirements, or reasonable method for estimating the number of grandfathered policies that will be in existence in 2014 and beyond, these provisions of the ACA are not included in our model. If additional data is made available on characteristics of firms that offer grandfathered plans, they could potentially be integrated into the model.

Expansion of public programs

Currently families with children and seniors or persons with disabilities or medical needs must meet various categorically based income thresholds to qualify for Medi-Cal. Infants and pregnant women can qualify for Medi-Cal with family incomes of 200 percent of FPL or less. While children aged 6 to 19 and their parents must have family incomes under 100 percent of FPL to be eligible, seniors and persons with disabilities need to have an income of

133 percent of FPL or below. Childless adults with medical need are eligible with incomes up to 75 percent of FPL.[2] The ACA will raise the threshold to 133 percent of FPL and create consistency in Medicaid programs across states. In addition, the ACA requires the use of MAGI (Modified Adjusted Gross Income – see section 4.4 for details on calculating MAGI) and expands eligibility to all individuals meeting the income requirements, including childless adults who are currently not eligible. However, in order to maintain existing programs and to calculate federal matching contributions, both "old" and "new" Medicaid eligibility criteria will be used to evaluate eligibility for the programs in each state. Despite that administrative detail, the intent of the law is to make everyone who earns a family income of 133 percent of FPL or lower eligible for Medicaid, regardless of age, health status, or family type.

In 2014, states will be incentivized by increased federal matching funds to expand Medicaid eligibility to 133 percent of FPL (with a 5 percent income disregard making the effective limit 138 percent of FPL).[3] If it is cost-effective, California is required to offer premium assistance to Medicaid beneficiaries who are offered employer sponsored insurance (ESI).[4] The federal government will cover 100 percent of the cost of Medicaid expansion in all states in 2014–2016, 95 percent in 2017, 94 percent in 2018, 93 percent in 2019 and 90 percent in 2020 and subsequent years.[5] For those states that have already expanded coverage, the federal government will cover the additional cost of covering adults below 100 percent of FPL; the federal government will pay 50 percent of the difference between the state's match rate and the Medicaid expansion match rate in 2014, 60 percent in 2015, 70 percent in 2016, 80 percent in 2017, 90 percent in 2018 and 100 percent in 2019 and subsequent years.[6]

It is not yet known what share of the eligible population will take up Medicaid coverage in each state. Due to the presence of the Health Care Coverage Initiative and Low-Income Health Program "Bridge to Reform" §1115 Medicaid waiver in California, the take-up rate could be higher in comparison to other states without a similar transitional program to enroll eligible residents.

States are required to maintain current Children's Health Insurance Program (CHIP) eligibility standards through 2019. CHIP funding will be extended through 2015 and the

[2] http://www.chcf.org/~/media/MEDIA%20LIBRARY%20Files/PDF/M/PDF%20MediCalFactsAndFigures2009.pdf

[3] UC Berkeley Labor Center Summary of Affordable Care Act Provisions Affecting Children, Non-Elderly Adults and Employers; Affordable Care Act, Sec. 1201

[4] UC Berkeley Labor Center Summary of Affordable Care Act Provisions Affecting Children, Non-Elderly Adults and Employers; Affordable Care Act, Sec. 2003

[5] UC Berkeley Labor Center Summary of Affordable Care Act Provisions Affecting Children, Non-Elderly Adults and Employers; Affordable Care Act, Sec. 1201

[6] Ibid.

federal CHIP match rate will increase by 23 percentage points between 2015 and 2019.[7] CHIP-eligible children who cannot get coverage due to waiting lists can get subsidized coverage in the exchange.[8] CHIP income eligibility rules will change to be based upon modified adjusted gross income.[9]

[7] UC Berkeley Labor Center Summary of Affordable Care Act Provisions Affecting Children, Non-Elderly Adults and Employers; Affordable Care Act, Sec. 2101
[8] Affordable Care Act, Sec. 2101
[9] Affordable Care Act, Sec. 1004

Exhibit 3. ACA Phase-In Checklist

		Large Group (101+ employees)			Small Group (2-100 employees)			Individual			Self-Insured
		Grand-fathered	New	Exchange*	Grand-fathered	New	Exchange	Grand-fathered	New	Exchange	
2010	Young adults are able to stay on or come on their parents health plan until 26	✓	✓	N/A	✓	✓	✓	✓	✓	✓	✓
	NOTE: Prior to 2014, young adults may be covered by their parents' grandfathered employer group health plans only if they are not offered a plan through their employer.										
	Prohibition against rescinding coverage once enrollee is covered under a plan	✓	✓	N/A	✓	✓	✓	✓	✓	✓	✓
	Prohibitions against lifetime benefit limits	✓	✓	N/A	✓	✓	✓	✓	✓	✓	✓
	Prohibition on pre-existing condition exclusions for children	✓	✓	N/A	✓	✓	✓		✓	✓	✓
	Prohibitions against restrictive annual benefit limits	✓	✓	N/A	✓	✓	✓		✓	✓	✓
	NOTE: 9/23/2010 - 9/23/2011 No annual limits on benefits less than $750,000; 9/23/2011-9/23/2012 No annual limits on benefits less than $1.25 million; and 9/23/2012- 1/1/2014 No annual limits on benefits less than $2 million. Some plans have been granted waivers to the annual limit requirements through 2013.										
	Required Coverage of Recommended Preventative Care and Immunizations without cost sharing		✓	N/A		✓	✓		✓	✓	✓
2011	Limits on share of Private premiums insurers spend on nonmedical costs	✓	✓	N/A	✓	✓	✓	✓	✓	✓	
	NOTE: Spending no less than 80 percent of premiums on medical costs (small group and individual markets) or 85 percent in large group employer plans.										
2012	Quality Reporting by Health Plans		✓	N/A		✓	✓		✓	✓	✓
2014	New Insurance Rating Rules			N/A		✓	✓		✓	✓	
	NOTE: Premiums offered in the exchange, individual or group plans may vary by the following: 1. whether an individual or family is covered; 2.the geographic or "rating area" in which the coverage is offered, as established by each state or HHS; 3.age, although age rating cannot vary by more than 3 to 1 for adults—meaning the highest premium rate for adults can be no more than three times the lowest premium rate; and 4.tobacco use, where the highest premium rate may be no more than 1.5 times the premium rate for a nonsmoker.										
2014	Prohibition of Preexisting Condition Exclusions for adults ages 19+	✓	✓	N/A	✓	✓	✓		✓	✓	✓

Guaranteed Availability and Renewability of Coverage		✓	N/A		✓	✓		✓	✓	
Prohibition of Discrimination based on Health Status and gender		✓	N/A		✓	✓		✓	✓	✓
Limits on Waiting Times for coverage	✓	✓	N/A	✓	✓	✓				✓
NOTE: Prohibits all group health plans from imposing waiting periods for coverage to go into effect of more than 90 days										
Ensuring Coverage for Individuals Participating in Clinical Trials		✓	N/A		✓	✓		✓	✓	✓
NOTE: Health Plans cannot drop coverage if an individual decides to participate in a clinical trial.										
Essential Health Benefits Package			N/A		✓	✓		✓	✓	Small group
NOTE: Qualified Health Plans have to at least offer Silver and Bronze Plans										
Premium Credits for qualified health plans for the exchange for those earning between 133%-400% FPL			N/A			✓			✓	
Cost-Sharing and Out-of-Pocket Limits		✓	N/A		✓	✓		✓	✓	
NOTE: Plans must limit out-of-pocket costs to $5,950 for single coverage and $11,900 for family coverage (2010 dollars). The law further limits the amount of out-of-pocket cost-sharing for families earning up to 400 percent of poverty for qualified health plans purchased through the exchange.										
Risk Pooling		✓	N/A		✓	✓		✓	✓	
NOTE: Insurance carriers selling health plans in the exchange have to pool risk for the exchange plans and individual plans, and those who are not in the exchange.										
Traditional Reinsurance-Payments will be collected		✓	N/A		✓			✓		✓
Make Payments to those health plans that cover high risk individuals			N/A			✓		✓	✓	
Risk Corridor			N/A		✓	✓		✓	✓	
Risk Adjustment			N/A		✓	✓		✓	✓	

Notes: *Large group plans are not going to be available in the Exchange until 2017, at each state's option

2.3 Eligible Populations

Characteristics of firms offering and not offering coverage pre-reform

The California Employer Health Benefit Survey (CEHBS) from the California HealthCare Foundation and the National Opinion Research Center provides a constructed profile of firms in the state based on industry type, size (i.e. number of employees), wages of employees, and information about their insurance offerings to their employees including premiums paid, employee share, and benefits. There are approximately 800 firms in the sample of California firms with complete data in each year of CEHBS. Variation on coverage offer, wage, and hours worked by employees exists based on size of firm and industry. Generally, large firms are far more likely to offer insurance to their employees than smaller firms.

Exhibit 4. Characteristics of Offering Firms, California, 2010

Size of Firm	% of Firms Offering Coverage to FT workers	Offering Firms			Non-Offering Firms
		Employee Wages (% <$21,000)	Average Employee Share of Individual Coverage	Average Employee Share of Family Coverage	Employee Wages (% <$21,000)
3-9	65.0%	5.3%	4.1%	24.3%	30.8%
10-50	82.7%	10.7%	16.7%	43.0%	27.5%
51-100	90.6%	15.2%	16.1%	40.8%	27.1%
101-200	98.9%	11.4%	10.8%	37.0%	60.9%
200+	99.1%	17.4%	12.2%	21.1%	85.0%

Source: California Employer Health Benefit Survey

Characteristics of individuals eligible for the Health Benefit Exchange

Exhibit 5. Insurance Status by Subsidy Level, Ages 0-64, California, 2009

Federal Poverty Level	Uninsured	Medi-Cal	Healthy Families	Employer-based	Individually purchased	Other public
0 - 138%	28.6%	46.4%	3.4%	15.3%	3.1%	3.2%
139 - 150%	26.4%	26.2%	6.3%	32.6%	4.0%	4.5%
151 - 200%	26.4%	16.4%	7.4%	40.0%	5.7%	4.1%
201 - 250%	19.7%	11.3%	4.0%	53.3%	6.6%	5.2%
251 - 300%	14.9%	8.0%	1.8%	62.9%	7.7%	4.8%
301 - 400%	11.8%	2.9%	1.0%	70.9%	9.1%	4.4%
Over 400%	5.8%	1.3%	0.4%	81.8%	8.0%	2.7%

Source: 2009 California Health Interview Survey (www.chis.ucla.edu).

3 CalSIM General Modeling Approach

The main objective of the CalSIM model is to understand and quantify the decisions of California individuals and employers in response to the ACA. CalSIM, drawing on health and labor economics and decision theory literature, forecasts the composition of insurance coverage to contribute to the progress and implementation of health policy reform in California. The CalSIM design stems from the intertwined relationships among decision-makers and insurance markets. Specifically, employer decisions reflect worker preferences, employer offering decisions impact insurance premiums, insurance premiums impact individual take up decisions, and public and private insurance markets interact with crowd-out, employer penalties, and mandates. The model mimics the no-wrong-door enrollment processes that will integrate Medi-Cal and SCHIP eligibility determination with the Exchange eligibility determination by assuming that individuals will seamlessly enter the appropriate eligible population no matter the status quo. Exhibits 6 and 7 provide flowcharts of the structure and dynamics of CalSIM.

The CalSIM individual data set is constructed by reweighting 2004–2008 MEPS-HC respondents to represent California's population primarily using 2009 California Health Interview Survey (CHIS) joint distributions of socioeconomic and demographic characteristics, including predicted immigration status. Individuals identified as workers are statistically matched with employer characteristics including wage and firm size from the Employment Development Department (EDD) 2007 analysis data. CalSIM creates a synthetic firm for each worker (the primary worker) by statistically matching the individual and EDD employer characteristics of each worker, including wage distribution, industry, and firm size, to a firm from the 2010 California Employer Health Benefit Survey (CEHBS), which includes the employer-sponsored insurance (ESI) actuarial value data for that firm. Using the wage distribution of workers within firms, synthetic co-workers are selected to populate the synthetic firm of each primary worker. The choices of the synthetic firm of each primary worker determine whether the worker will be offered benefits and the cost of such coverage.

CalSIM uses behavioral models of firm and individual insurance coverage decisions to iteratively simulate health insurance premiums, employer offering status, and individual take-up decisions. These iterations begin by estimating worker reactions to the newly available alternative to ESI, the Exchange, given the firm's status quo offering status, which informs an initial assignment of insurance choice probabilities to the synthetic firms' employees. The individual probabilities segment the employee population into those who will take up ESI if offered and those who will choose other forms of insurance depending on the cost of insurance, household income, and documentation status. Each of these decisions is linked to employees and their families. Those who are unemployed undergo a similar iterative assignment of take-up probabilities for Exchange-based or Medi-Cal coverage

based on their status quo insurance coverage status, the premium calculations due to community rating, health status, household income, and eligibility. Synthetic firms are assigned subsequent probabilities of continuing to offer or not offer, newly offering, or ceasing to offer coverage based on the applicable employee distribution. These decisions, once made by the firm and linked to each employee and their families, allow for final individual probabilities for insurance coverage choices to be assigned.

Exhibit 6. CalSIM Data Flow Diagram

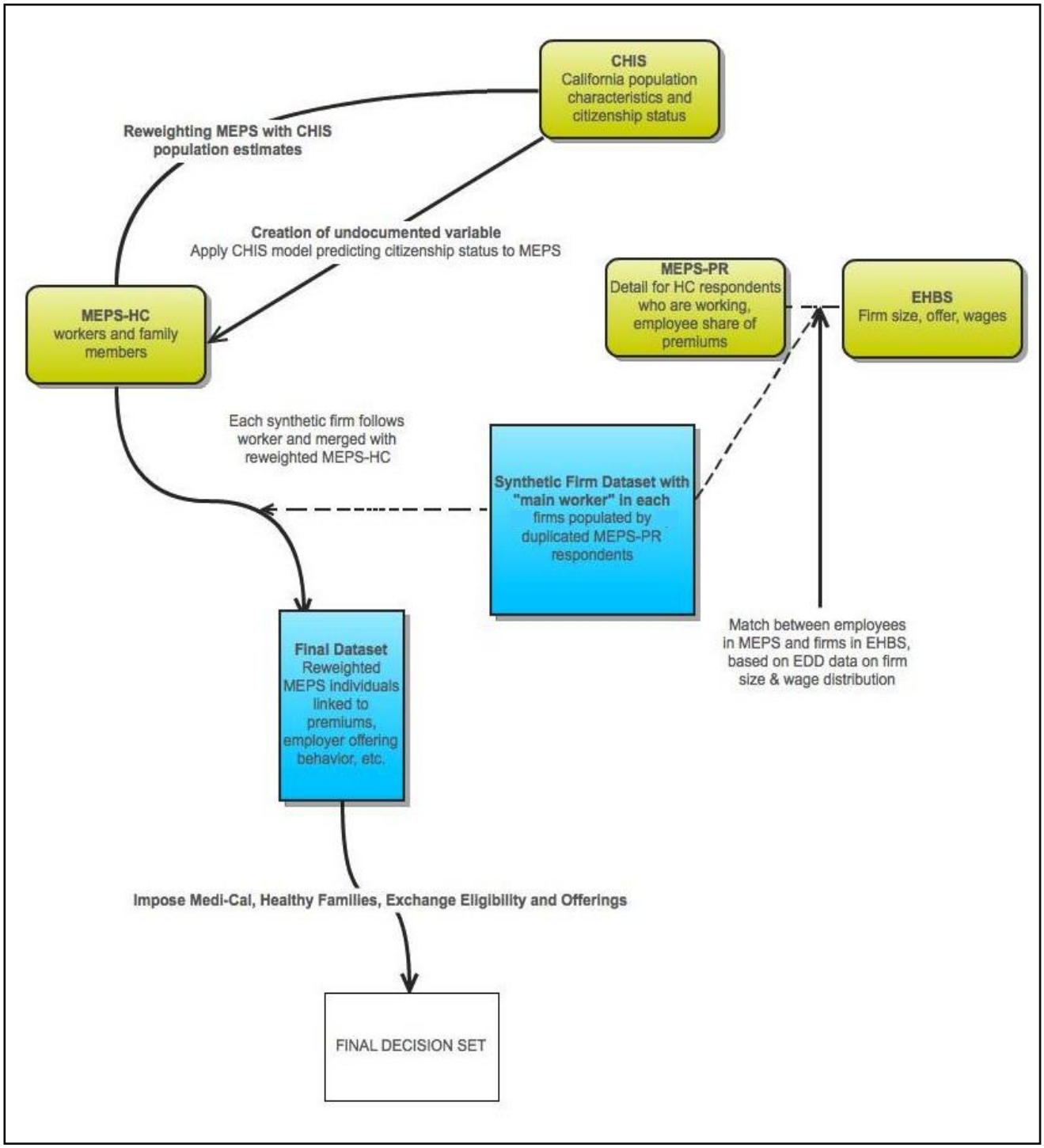
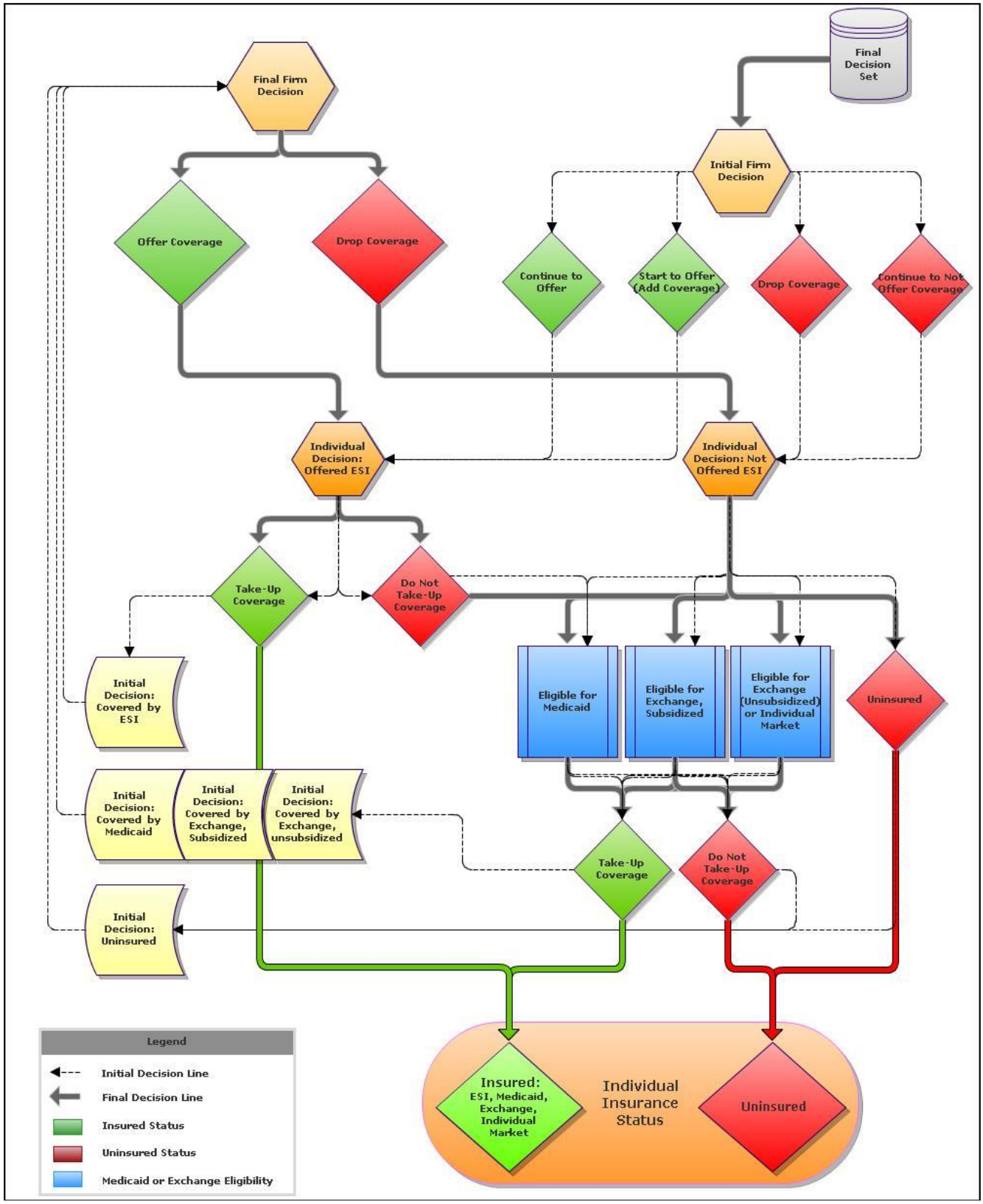


Exhibit 7. CalSIM Model Decision Flow Diagram



4 Data Construction

The CalSIM final decision data set is constructed in 8 stages: (1) data from the 2004–2008 Medical Expenditure Panel Surveys (MEPS) are pooled; (2) group employee contribution and actuarial value data reported by firms in CEHBS are used to impute group and non-group premiums data which is then merged to individuals; (3) immigration status is assigned to individuals using a multinomial logistic regression model fit to 2009 CHIS; (4) the individual data set is reweighted to reflect the 2009 CHIS reported California population; (5) working individuals are assigned co-worker wage distributions and firm size from EDD data, identified as primary workers, and matched to a firm of the corresponding size and wage distribution supplied from CEHBS data; (6) each primary worker is randomly assigned their reported number of co-workers, with a maximum of 100, based on firm size and similar wage distributions in order to statistically replicate the marginal CEHBS distributions; (7) non-working individuals (i.e., the unemployed and workers' spouses/dependents) are linked to the synthetic firm health plan decision through their household worker(s); (8) non-group medical premiums and Medi-Cal eligibility are determined and assigned to each individual and health insurance eligibility unit (HIEU) to complete the CalSIM final decision data set.

4.1 Individual Data

The CalSIM data set includes individual-level data from pooled 2004–2008 MEPS-HC, a nationally representative sample of U.S. residents reporting on socioeconomic, demographic, employment, health status, health insurance, and healthcare utilization characteristics. CalSIM uses MEPS to provide the underlying joint distribution of individual health care expenditures by household income, sex, age, source of coverage, employment status, and race/ethnicity. Households are identified as health insurance eligibility units (HIEU) in MEPS and data on spouses/dependents are linked to the corresponding primary worker or primary policyholders. In the case of unemployed and uninsured families (i.e., no identified worker or policyholder), the household's adult respondent is assumed as the primary policyholder.

We inflate the reported household income for each reported year up to the 2009 baseline year by the corresponding inflation rate from Bureau of Labor Statistics' Consumer Price Index for Urban Wage Earners and Clerical Workers (CPI-W). We assume the annual income growth after the 2009 baseline year to be 2.7 percent, the average annual increase in CPI-W over the preceding ten years. We also assume the 2001 and 2003 tax cuts passed during the Bush administration will be extended, but that there will be a 0.25 percent increase in the top marginal tax rate. Additionally, we account for population growth by calibrating the

year-specific non-elderly populations to U.S. Census projections. Premium growth, for all markets across the board, is assumed to be 6.5 percent per year.

Since MEPS does not include data on documentation status, we assign immigration status using a multivariate model developed using 2009 CHIS confidential data (see Section 4.5) to ensure that CalSIM accounts for the historically large unauthorized (undocumented) immigrant and legal permanent resident populations in California. By predicting immigration status, the CalSIM model adjusts Medi-Cal and Exchange eligible populations based on documentation status before determining firm and individual coverage decisions, rather than imposing an ex post adjustment. This approach enables a more accurate picture of the Medi-Cal and Exchange eligible and enrolled populations. (See section 4.5 for more details on the assignment of immigration status.)

Reweighting data to the California population

The CalSIM individual data are reweighted to reflect California's socioeconomic, demographic, and insurance coverage distributions as reported in 2009 CHIS data. These weight adjustments are done using an iterative raking procedure,[10] which controls for marginal distributions with multiple stratification dimensions. In raking, the sample weights for each classification are repeatedly adjusted such that the sum of the weights converges to the desired marginal distributions. The CalSIM raking procedure adjusts the data to match the marginal and joint distributions of age, socioeconomic status, health status and presence of chronic conditions, race/ethnicity, language, and immigration status in 2009 CHIS. CalSIM weights on the following variables and categories:

1) Age (0-18, 19-29, 30-44, 45-64 years)
2) Health coverage source (Uninsured, Individually Purchased, Medicaid & CHIP, ESI, Other Public)
3) Poverty Level (0-100% FPL, 101-138%, 139-200%, 201-250%, 251-400%, 401% and over)
4) Gender (Female, Male)
5) English Proficiency (question only asked of adults)
    a) Age 0-18 years
    b) Adult, speak English at home and interviewed in English OR speaks other language but speaks English "very well"
    c) Adult, at home or in interview use language other than English, speak English "well", "not well" or "not at all"
6) Work Status, Private/Public, Firm size, ESI offered and eligibility (8 categories)
    a) Not working or self employed

[10] We adjust sample weights using the Stata module *survwgt* described at http://faculty.virginia.edu/nwinter/progs/survwgt.hlp.shtml.

b) Working for private firm, size 2-99, firm offers, worker is eligible for ESI
c) Working for private firm, size 2-99, firm offers but worker is not eligible for ESI
d) Working for private firm, size 2-99, firm does not offer ESI
e) Working for private firm, size 100+, firm offers, worker is eligible for ESI
f) Working for private firm, size 100+, firm offers but worker is not eligible for ESI
g) Working for private firm, size 100+, firm does not offer ESI
h) Working in public sector

7) Citizenship (3 categories)
   a) Citizen or Legal Permanent Resident more than 5 years
   b) Legal Permanent Resident less than 5 years
   c) Resident without green card (proxy for undocumented resident)
8) Adult Smoker (Not an adult smoker, adult smoker)
9) Self-reported Health Status (Excellent, Very good, Good, Fair, Poor)
10) Number of Chronic Conditions - the total number of diagnosed chronic conditions of asthma, high blood pressure, adult diabetes and heart disease (maximum of 4)
11) Race and Latino Ethnicity (Latino, Asian/Pacific Islander not Latino, Black not Latino, White not Latino, Multi-racial and all other)

All marginal distributions are matched to those of the 2009 CHIS with the following exceptions. Income amounts are set to match those of the 2009 American Community Survey.[11] Immigration status is set to the 2009 estimates from the Immigration and Customs Enforcement for the number of legal permanent residents in the U.S for less than five years.[12] The number of undocumented residents is based on estimates from the Pew Hispanic Center.[13] While CHIS is used to estimate the number of private sector workers in the state, the distribution among the 6 categories of employer size and access to health benefits is set to that of CEHBS.

[11] Steven Ruggles, J. Trent Alexander, Katie Genadek, Ronald Goeken, Matthew B. Schroeder, and Matthew Sobek. *Integrated Public Use Microdata Series: Version 5.0* [Machine-readable database]. Minneapolis: University of Minnesota, 2010.

[12] Rytina N, 2010. *Estimates of the Legal Permanent Resident Population in 2009*. Office of Immigration Statistics, Policy Directorate, U.S. Department of Homeland Security. www.dhs.gov/xlibrary/assets/statistics/publications/lpr_pe_2009.pdf

[13] Passel JS and Cohn D. 2010. *U.S. Unauthorized Immigration Flows Are Down Sharply Since Mid-Decade*. Washington, DC: Pew Hispanic Center. http://www.pewhispanic.org/2010/09/01/us-unauthorized-immigration-flows-are-down-sharply-since-mid-decade/

Reweighting for regional or county level coverage estimates

CalSIM can also be used to predict coverage shifts for each of the seven CHIS California regions as well as some of the larger counties.[14] We estimate these coverage shifts at a local level by reweighting the CalSIM individual data to statistically match the distributions of variables described above to the county or regional distributions of interest. County level estimates of citizenship and immigration variables were made using 2009 CHIS confidential data. Additionally, all employment and access to ESI variables were generated using 2009 CHIS data since the EHBS provides only state level data. CalSIM draws all other variables at the local level from either 2009 CHIS or American Community Survey.

Due to this difference in data sources, estimates at the local level may not sum to state totals. The decreased availability and accuracy of data consequently require that regional and county estimates be used more cautiously than those at the state level.

4.2 Firm-Level Health Plan Data and Synthetic Firm Construction

Imputing employer information from CEHBS

While the MEPS-HC dataset includes information on each worker's employer, the data is reported on an individual level. Consequently, the CalSIM data set includes employer, or firm, level data supplied from the Employer Health Benefits Survey (EHBS), including health insurance offering status, wages of employees, size of the firm, and industry. The parent EHBS is a national study, however consistent with the CalSIM methodology, we use the California (CEHBS) subset representing just over 800 firms. It is important to differentiate our use of the term 'firm' (versus 'establishment') from the employer descriptions common to other simulation models. In this case we refer to 'firm' as the single location of a particular employer, whereas other models have referred to such employers as 'establishments' and 'firms' referring to employers with more than one location. The firm-level characteristics in CEHBS are used to statistically match primary workers and their co-workers to the corresponding framework of a synthetic firm.

Adding coworkers to form synthetic firms

To create synthetic firms, each MEPS worker is randomly assigned applicable firm-level data for a CEHBS firm that matches the size and offering status of their employer. Sample size limitations on firm-level data require each set of firm characteristics to be assigned to workers with replacement, leading to multiple workers from MEPS being assigned identical

[14] For definitions of regions see Table 7-2 Regions in California, CHIS 2009 Methodology Report Series #5, page 7-7, http://www.chis.ucla.edu/pdf/CHIS2009_method5.pdf

firm characteristics. Additionally since large non-offering firms are not reported in the CEHBS data, CalSIM treats the assignment separately, albeit identically, for offering versus non-offering firms in order to limit any bias towards large offering firms.

Next, CalSIM synthetic firm construction requires the integration of a custom analysis conducted by the California Employment Development Department (EDD) in 2007 that provides information on the proportions of workers in each of five different wage categories, stratified by firm size working with co-workers of other wage categories. We allocate to each primary worker a co-worker wage distribution for the firm size that each respondent reports in MEPS-PRPL.

Given the limitations in sample size for the distributions of worker and employer characteristics, CalSIM uses semi-constrained statistical matching of co-workers to primary workers with replacement, where a single individual worker may appear in the synthetic firm data set as a co-worker multiple times. Additionally, CalSIM uses worker and employer industry categories to constrain the sample space of the synthetic co-workers. For each firm, CalSIM randomly selects the number of co-workers that the primary worker reported as firm size (up to a maximum of 100 individuals) with the same firm size, offer status, and industry joint distribution as the firm's assigned primary worker to statistically replicate the five category wage distribution that the EDD data would predict for that worker's synthetic firm. Although random, the co-worker selection remains proportional to the population weights constructed from CHIS in order to keep with the CalSIM modeling objectives. As a result of this process, we have created a set of matched co-workers as they align with the wage distributions for each available primary worker. CalSIM weights each co-worker to the CEHBS marginal distributions of firm employee age and full-time employment status, thereby statistically matching sets of co-workers to the corresponding synthetic firm framework created by the CEHBS firm-level data. Synthetic firms are created for all primary workers in MEPS including those who are not offered health insurance and those that did not take up coverage when offered ESI.

4.3 Medical Premium Calculation

CalSIM uses Employer Sponsored Insurance (ESI), also known as job-based coverage, as the basis for insurance costs in California. Using the underlying health care premium costs of employees in private sector firms, accounting for benefit levels and administrative costs, we calculate initial estimates of ESI group premiums which are then normalized to match the within firm weighted average premium prices found in the CEHBS. Additionally, the underlying medical costs of the employees become the basis for calculating premiums for both non-offering firms and for the non-group market. We discuss each step below.

Group premiums for firms offering health benefits

CalSIM first assigns each individual a cost index, based on age and self-reported health status factors,[15] to approximate their expected medical costs. This initial cost index is calculated by multiplying the individual's health-based cost index by her age-based cost index. The ratio of the cost index for health, relative to those in excellent health, is 1.21 for very good health, 1.84 for good health, 3.47 for fair health and 5.8 for poor health. The ratio of the cost index for age, relative to ages 40-44, spans amounts of 0.45 for children under 19 to 2.41 for adults ages 60-64.

To compute the premium cost for a single worker, we average the cost indices for all workers and their family members within each primary worker's synthetic firm. Next, we estimate the ESI plan actuarial values, ranging from 0.6 to 0.96, from an analysis of the 2010 CEHBS provided by Towers Watson and the National Opinion Research Center. CalSIM multiplies the average cost indices by the actuarial values for each firm, which consequently reduces the cost index. We further adjust the cost indices by an administrative loading factor of $(1/1-\delta)$, which is based on firm size and derived from published research by RAND using the Urban Institute methodology.[16] Specifically, the administrative loading factor represents the percentage of the total premium used for administrative expenses and profits for the insurer. These loading factors are as follows: $\delta=0.2$ (or 20 percent) for firms less than 25 employees, $\delta=0.13$ for firms of 25-99 employees, $\delta=0.083$ for firms with 100 or more employees. Within each firm, CalSIM calculates the total cost index by summing over all policy holders and dependents, giving an estimate of the total annual medical premium for the employees of the firm.

Additionally, premium calculations use the co-worker weighting scheme described above for those primary workers who take up an ESI offer through their employer. To determine employee contribution rates for single and family plans, CalSIM uses data from CEHBS which is associated with each synthetic firm through the primary worker. We assume that contribution rates for dual adult and single parent with children plans are the same as for family plans.

Each individual worker's premium is adjusted for the type of family plan required based on the composition of the household insurance eligibility unit (HIEU). The ratio of premium plan pricing relative to a single plan is 2:1 for dual coverage, 1.5:1 for one adult and one

[15] Age and self-reported health status factors used in health care cost index provided by: Gruber J. February 2000. *Tax Subsidies for Health Insurance: Evaluating the Costs and Benefits*. NBER Working Paper No. 7553. National Bureau of Economics Research. http://www.nber.org/papersIw7553

[16] Girosi F, Cordova A, Eibner C, Gresenz CR, Keeler, Ringel EJ, Sullivan J, Bertko J, Beeuwkes Buntin M, Vardavas R. 2009. *Overview of the COMPARE Microsimulation Model.* RAND Health working paper series. www.rand.org/pubs/working_papers/2009/RAND_WR650.pdf

child, 2:1 for single adult with multiple children, and 2.86:1 for family plans.[17] Premium prices for all plans within a synthetic firm are calibrated to ensure that the sum of the health plan policies equals the total annual medical premiums for the firm. Lastly, all premiums are uniformly adjusted so that the average single premium across all synthetic firms equals the average single premium reported by CEHBS ($5,463 for private sector firms in 2010).[18]

Lastly, CalSIM uses the final premium costs for firms offering benefits to calibrate individuals' intermediate cost indices to represent the underlying medical costs for all individuals. These are adapted to construct hypothetical premiums for those synthetic firms that do not offer ESI as well as estimate the pre-policy premiums on the individual market. This adaptation is described in further detail in the sections below.

Group premiums for non-offering firms

For those firms that do not currently offer ESI, CalSIM calculates a hypothetical premium the firm would observe if it had offered ESI. This premium calculation uses the same method as for currently offering firms with the calibrated cost indices described above. However, these imputations of non-offering firm premiums require additional assumptions. We assume that the actuarial values used for non-offering firms are based on the average income of the workers in that synthetic firm. Specifically, we assume that firms with higher average wages tend to have higher benefit levels. For firms with fewer than 100 employees, the actuarial value is generated from a normal $N(\mu_m, \sigma_m^2)$ random variable such that it falls between 0.7 and 0.95, where μ_m is the standardized average income relative to firms of similar size and σ_m is derived so the value predominately falls inside the range. A final truncation reduces outliers to ensure a maximum actuarial value of 0.95 and a minimum of 0.7 across all firms. Similar operations are performed for firms with 100 or more employees so that actuarial value falls between 0.75 and 0.975.

Additionally, we assume that employee contribution rates for all non-offering firms equal the average employee contribution rates for single and family plans as reported in CEHBS.

Pre-ACA non-group premiums

To compute pre-policy non-group premiums, CalSIM uses the cost indices calibrated from the offering firms' premiums, as discussed previously. Essentially, these premiums represent the cost for each individual to purchase a health plan on the non-group market in the absence of the ACA. For a single individual, non-group premiums equal this cost index

[17] Based on average premiums for single and family plans. California Health Benefits Survey. 2009. *California Health Care Almanac*. http://www.chcf.org/resources/download.aspx?id=%7b5D7E279F-7DC2-41C3-8CAC-C9876651A992%7d

[18] Ibid.

adjusted for an administrative loading factor of 30 percent.[19] For family plans, we assume there are three structured plans on the non-group market: dual adult, single adult with children, and dual adults with children. Dual premiums are calculated as the sum of two single premiums. We assume premiums on additional children are half the cost of a 40–44 year old adult with excellent health. Additionally, CalSIM assumes that all single parent and family plan premiums do not depend on age, health status, or number of children within a family. Instead, single parent plans are priced as if there are 1.32 children, while family plans are priced as if there were 1.46 children, which match the average number of children in single parent and two parent families.

Post-ACA non-group premiums

CalSIM structures the post-policy non-group premiums calculations according to the specifications in the ACA. Specifically, the ACA requires modified community rating in determining non-group premiums, as purchased on the Health Benefit Exchange market, and allows insurers to vary premiums solely on single versus family plans, geographic area, age (with a maximum 3:1 ratio), and tobacco use (with a maximum 1.5:1 ratio). Drawing on these regulations, CalSIM simulates premium determination based on age, plan type, smoking status, and community rating using an iterative method, with considerations for fluctuating eligible populations (communities) due to income modifications and ESI affordability.

Specifically, CalSIM imputes a single Exchange silver plan premium which has a 70 percent actuarial value. We assume that premiums vary linearly by age within the range across age bands of the proscribed maximum 3:1 ratio. CalSIM iteratively modifies the initial Exchange population and premiums for the enrolled population based on individual take-up responses to firm offer decisions. Consequently, CalSIM calculates the Exchange silver plan premium in each iteration to account for the community rating effects due to changes in average age and percentage of smokers.

CalSIM separately calculates the catastrophic or 'young and invincible' plan premiums using a distinct risk pool for the population between ages 19 and 29. These catastrophic plans are based on a 55 percent actuarial value based on feedback from Towers Watson.

In addition to simulating the Exchange eligible populations and premiums, CalSIM calculates the maximum contribution towards premiums paid by each HIEU for the appropriate single or family plan, as a function of the household modified adjusted gross income and the ACA premium subsidy sliding scale. Consequently, we are able to estimate eligibility for cost-sharing subsidies based on the maximum HIEU contribution, the 70

[19] Pauly M, Percy A, and Bradley Herring B. 1999. *Job-based health insurance: weighing the pros and cons.* Health Affairs, 18, no.6:28-44.

percent actuarial value of the Exchange silver plan, the silver plan premium, and the subsidy sliding scale (see Section 2.2 for further details on the subsidy and cost-sharing sliding scales).

4.4 Calculating Modified Adjusted Gross Income (MAGI)

Medi-Cal and Exchange eligibility determination under the ACA requires the use of Modified Adjusted Gross Income (MAGI). CalSIM adjusts reported family income to account for certain aspects of MAGI calculations. Defined in the ACA, MAGI is the adjusted gross income (AGI) increased by foreign-earned income and housing cost, and any amount of interest received or accrued by the taxpayer during the taxable year which is exempt from tax.

Based on internal analysis of the most updated data released by the IRS, we find that the largest percentage of adjustments made in the calculation of AGI are the self-employed tax deductions (12 percent), followed by student loan interest deduction, and then educator expense deduction, tuition and fee deductions, and self-employed health insurance deduction (all at 3 percent). While MEPS-HC provides data that allows CalSIM to adjust for self-employed tax deductions, no data to adjust for the other items in the AGI are reported.

Additionally MEPS-HC does not report foreign-earned income, housing costs, or exempted accrued interest to facilitate a precise calculation of MAGI. We estimate that such adjustments affect 0.3 percent of the population, and are unlikely to have a significant impact on income calculations for Medicaid and Exchange eligibility determination. Additionally, there is no readily available information on the amount of interest received or accrued by the taxpayer during the taxable year which is exempt from tax. This affects about 4.5% of the households filing at an average amount of $12,370. Due to this data limitation in accounting for the difference between MAGI and AGI, CalSIM assumes that the difference is negligible across the aggregated population and does not significantly impact income or subsidies for purchasing insurance.

Given the availability of MEPS data and the importance of self-employed tax deductions, CalSIM accounts for these deductions through the following calculation which is incorporated into the calculation of income for all respondents who report self-employment. Self-employed tax deductions are 50 percent of the self-employment tax rate of 15.3 percent. Eliminating the self-employed tax deduction (7.65 percent) increases taxes and decreases total income accordingly. Although the 2011 tax holiday decreased the self-employment tax rate to 13.3 percent, resulting in an average tax deduction of 6.65 percent,

Exhibit 12: Calculated Percentage of Filers in 2008 Who Adjusted Income and Average Amounts of Adjustments, 2008. Number of Filers: 142.5 million

	# of returns in thousands from IRS data	Total amount in millions from IRS data	Calculated % of returns filed	Calculated Average amount per return
AGI (deductions)				
Total	35,774	121,599	25.10	3,399
Payment to IRA	2,740	11,666	1.92	4,258
Educator expense deduction	3,753	947	2.63	252
Business expenses of reservists, performing artists	129	416	0.09	3,225
Moving expenses	1,113	3,003	0.78	2,698
Student loan interest deduction	9,136	7,731	6.41	846
Tuition and fees deduction	4,577	11,002	3.21	2,404
Health savings accounts deductions	836	2,210	0.59	2,644
Self-employment tax deduction	17,411	24,286	12.22	1,395
Self-employed health insurance deduction	3,618	21,194	2.54	5,858
Payment to a self-employed retirement plan	1,010	20,262	0.71	20,061
Penalty on early withdrawal of savings	1,311	389	0.92	297
Alimony paid	580	9,621	0.41	16,588
Domestic production activities deduction	502	7,011	0.35	13,966
MAGI (additions)				
Foreign earned income and housing cost	372	22,891	0.26	61,535
Any amount of interest received or accrued by the taxpayer during the taxable year which is exempt from tax.	6,453	79,822	4.53	12,370

Source: Bryan, J. (2008) "Total Income Tax Returns," Internal Revenue Service *Statistics of Income Bulletin*.

we assume that this tax holiday will not be extended and use a tax rate of 15.3 percent for self-employed individuals. CalSIM adjusts total income for those reported as self-employed to account for the MAGI calculations by increasing total income by 7.65 percent before determining Medi-Cal or Exchange eligibility.

4.5 Assigning Immigration Status

Immigration status in CalSIM includes three mutually exclusive categories: citizen or legal permanent resident in the U.S. for five or more years, legal permanent resident in the U.S. fewer than five years, and unauthorized immigrant (undocumented). Imposing a five year threshold for the legal permanent resident population stems from the federal Medicaid eligibility requirement of five years legal residency. While California currently allows legal residents with fewer than five years in the U.S. to enroll in Medi-Cal, it is a completely state-funded population and subject to state budget constraints. We are interested in the probability of persons being unauthorized immigrants (undocumented) as they are ineligible for subsidies and Medi-Cal expansion via the ACA, but could benefit from guaranteed issue individual market insurance and employer-sponsored insurance coverage, and will continue to participate in the California healthcare system.

As discussed previously, MEPS does not include data on documentation status. However, beginning with MEPS 2007, there is available information as to whether an individual was born in the United States. To take advantage of this available data, we constructed multivariate models to predict immigration status separately for the 2004-2006 and 2007–2008 MEPS-HC respondents, segmenting the population into adult and child respondents. We use 2009 CHIS confidential data, in a separate analysis, to fit a multinomial logistic regression to data on all adults not born in the United States using a three category immigration status dependent variable, where 'no green card' acts as a proxy for undocumented immigrant status. CalSIM uses the parameter estimates from this model to compute mutually exclusive predicted probabilities (where $\Sigma p_n^*=1$) that each foreign-born adult (among respondents to the 2007 and 2008 MEPS) falls into each of the three immigration statuses.

To estimate the immigration status for the 2004–2006 MEPS individuals for whom we do not have country of birth information, we use 2009 CHIS confidential data to fit a multinomial logistic regression to data on all adults using the three category immigration status dependent variable. To account for the effect of birth in the U.S. and the number of years one has been living in the U.S. on the predicted immigration status, we include control variables for these characteristics among those specifically reporting these values in 2007 and 2008 MEPS. CalSIM multiply imputes the values for these characteristics among

respondents to the 2004, 2005, and 2006 MEPS using all available data from 2004–2008 MEPS. Similar to the approach describe above, CalSIM then uses the parameter estimates from the CHIS multinomial logistic model to compute mutually exclusive predicted probabilities that each adult falls into each of the three immigration statuses, controlling for the imputed characteristics of U.S. born and years lived in the U.S.

CalSIM proceeds from these probabilities to an immigration status assignment for each individual by dividing the interval (0,1) into three segments, with the lengths of the three segments given by the individual's predicted probabilities. The individual is then assigned the immigration status corresponding to the interval segment into which a random number drawn from a uniform distribution U[0,1] falls. This approach is also used to estimate the predicted probabilities and assign immigration status to children and teens under the age of 18, except that we control for the immigration statuses of the parents in the estimated multinomial logistic regression and include these assigned immigration statuses from the above scheme as additional parameters.

By predicting immigration status within the individual dataset construction process, the CalSIM model is able to adjust Medi-Cal and Exchange eligible populations based on documentation status before determining firm and individual coverage decisions, rather than imposing an ex post adjustment. This approach enables a more accurate picture of the Medi-Cal and Exchange eligible and enrolled populations.

4.6 Employer and Individual Penalties and Excise Tax Calculations

CalSIM includes the employer penalties and applicable excise taxes on high cost health insurance plans in the premium spending analysis within the firm decision-making process (see Section 5.1). Specifically, as described in Section 2.1, firms that employ 50 or more full-time equivalent employees who do not offer coverage to employees and have at least one employee receiving subsidies in the Exchange are subject to an annual penalty of $2,000 per full-time employee (full-time is defined as 30 or more hours per week). These $2,000 penalties are not collected for the first 30 employees in a firm. Firms that offer coverage are subject to an annual penalty of $3,000 per full-time employee who receives subsidies in the Exchange due to lack of affordability (defined as single premium employee contribution of more than 9.5 percent of income) or ineligibility for their employer's plan. CalSIM produces estimates of the corresponding employer penalty for each working individual assuming her employer does not offer coverage and based on the income and full-time employment status distributions at her firm. These estimates are assigned regardless of status quo insurance offering or take up status. In accordance with the ACA, CalSIM adjusts these penalties by the excess of insurance premium growth over cost of living inflation—which is calculated from

the Consumer Price Index and assumed to be 2.7 percent per year after 2009—per year after 2014.

Starting in 2018, the ACA subjects insurers to an excise tax of 40 percent that will be applied to the excess value of any premium above $10,200 for an individual policy or $27,500 for a family policy. The cost of this tax is likely to be passed on to employers and employees through higher premiums. CalSIM accounts for this excise tax by assigning it to individuals whose calculated premium reaches these threshold amounts in 2018, based on annual premium increases of 6.5 percent and controlling for cost of living inflation. Rather than adding on the 40 percent excise tax, CalSIM adjusts the actuarial value for the individual's plan to account for the increased total premium (with the additional value of the tax) paid by employer and employee contributions, effectively decreasing the actuarial value of the plan and its cost value to the employee.

CalSIM includes the individual penalties imposed by the minimum coverage requirement of the ACA in the cost analysis simulated within the individual decision-making process (see Section 5.2). As described in Section 2.2, those who do not obtain health insurance coverage, with the exception of those meeting specific exemption criteria, will be penalized $95 or 1 percent of taxable income in 2014, $325 or 2 percent of taxable income in 2015, and $695 (up to a maximum of $2,085 per family) or 2.5 percent of taxable income in 2016. CalSIM adjusts the flat rate penalty by cost of living inflation for years after 2016, and uses these thresholds and the calculated MAGI to determine the penalty for each individual assuming they do not have insurance coverage. Additionally, CalSIM accounts for removal of the individual penalty for those below the taxable income filing threshold when calculating the penalty.

4.7 Eligibility Determination

Medi-Cal and SCHIP eligibility determination

To determine Medi-Cal and SCHIP eligibility, detailed program rules regarding income and age thresholds, family structure and employment, treatment of income disregards, and type of individuals included in the eligibility unit are required. As specified in Section 2.2, the ACA reforms the eligibility requirements for MAGI-based Medicaid to eliminate state-based income disregards. As a substitute, the ACA establishes a new national floor at 133 percent FPL with a standard 5 percent income disregard, which effectively increases the threshold to 138 percent FPL. The ACA also requires states to maintain current CHIP eligibility standards through 2019, a maximum income threshold of 250 percent FPL for uninsured children age 18 and under in California. Consequently, CalSIM simulates Medi-Cal and CHIP

eligibility based on age, MAGI (as a percentage of FPL), and immigration status, which is predicted as described Section 4.5.

Health Benefit Exchange eligibility determination

To determine eligibility for Exchange subsidies, CalSIM first establishes an initial eligibility based on whether those who are currently working, and have been offered ESI, can enroll in affordable coverage. This is calculated from a comparison of the imputed single premium contribution as share of family income, described above, and the threshold for unaffordability (single premium contribution of more than 9.5% of family income) inflated by the excess of medical premium growth over cost of living inflation. CalSIM identifies an individual as initially Exchange eligible when his ESI offer is unaffordable. Additionally, CalSIM takes into account an individual's eligibility for Medi-Cal, as the ACA specifies that eligibility for Medicaid renders one ineligible for Exchange subsidies.

5 CalSIM Decision Models

5.1 Firm Decision

The fundamental driver of firm decisions in the CalSIM model is the net monetary loss or gain due to potential changes in offering status as a result of ACA provisions (e.g., employer penalties, premium pricing) or worker preferences and responses to a possible ESI offer. Specifically, CalSIM assumes that employers act as purchasing agents for all of their employees. This assumption requires calculations of cost for the employer to offer ESI, which results from a summation of the firm's ESI premium contribution across all employees projected to take up. Firms evaluate whether ESI is a cost effective route for employees to obtain health insurance given the landscape of options under the ACA. Accordingly, we assume that firms have complete information regarding employee family structure, income levels, and coverage preferences to enable the determination of whether compensation is best given as wages or health benefits. CalSIM simulates this determination by estimating the following cost calculations, totaled over each firm's workforce:

$$TC_{coverage,\ offer} = C_{ESI} - S_{Employer,\ Employee\ tax} \quad (1)$$

where $TC_{coverage,\ offer}$ is the total cost to the firm and the individual for the worker to obtain coverage if the firm offers ESI, C_{ESI} equals the cost of the employer health plan, and $S_{Employer,\ Employee\ tax}$ is the savings due to premium exemption from employer payroll and employee income taxes;

$$TC_{coverage,\ no\ offer} = C_{Employer\ penalty} + C_{Employee\ \text{coverage}} \quad (2)$$

where $TC_{coverage,\ no\ offer}$ is the total cost to the firm and the individual for the worker to obtain coverage if the firm does not offer ESI, $C_{Employer\ penalty}$ equals the employer penalty, and $C_{Employee\ \text{coverage}}$ is the cost for employees to purchase equivalent coverage in the Exchange, taking into account applicable premium subsidies.

Here, the cost of the employer health plan (ESI) is estimated as described in Section 4.3. Taxes include all payroll and income taxes on individuals and employers in California pursuant to state and federal tax code; these include Federal and State payroll and income taxes, Social Security, Medicare, Unemployment, State Disability, and Employment Training. The employer penalty is calculated by firm characteristics as required by the ACA and described in Section 4.6. The cost to provide equivalent coverage in the Exchange refers to the amount employees would pay for their families to purchase a plan through the Exchange that is of equal actuarial value to that of the employer plan.

Equations (1) and (2) provide the mean cost for an employee in the firm to obtain coverage through ESI or through alternative plans. Where (1) is less than (2), employers have an incentive to offer ESI. Alternatively, where (2) is less than (1) employers have a greater incentive to not offer coverage and pay the applicable employer penalties for their eligible employees to access subsidies through the Exchange. For those firms offering coverage in the status quo, CalSIM calculates (1) and (2) for those employees with ESI, effectively making the decision only over those who currently take up coverage. Alternatively, for firms that do not offer coverage in the status quo, CalSIM estimates (1) and (2) across all employees.

To account for inertia in employer behavior, CalSIM requires the combined employer and employee savings to exceed 10 percent to initiate any change in the firm's offering status. Additionally, CalSIM assumes a compensating wage effect where, regardless of the employer decision, the total compensation to employees remains constant such that all costs and savings due to the employer's decision are passed on to employees through decreases or increases in wages.

Due to the limited duration of the small business tax credit, CalSIM assumes it has no impact on non-offering firms, but does provide incentives for those small firms currently offering to maintain their ESI offer. We adjust the tax calculations in equation (1) by the amount of the credit and apply this impact through 2015.

Additionally, given the complexities involved in the process of adding or dropping ESI offer, we do not expect every firm with the relevant financial incentives to immediately change offer status in the first year of the ACA implementation. Accordingly, CalSIM assumes a lag in employer responses to the ACA with the following phase-in adjustment to firm offering decisions during the initial years of the law: in 2014, 20 percent of firms that would switch from their status quo actually do so, which increases to 40 percent in 2015, 60 percent in 2016, 80 percent in 2017, and fully applies employer responses by 2018.

CalSIM informs the firm's decision, using an iterative process, with the characteristics of its employees who will subsequently take up that offer. To mimic a firm's understanding of employee preferences, we assign an initial firm decision based on the firm's entire workforce. The firm's decision to offer then applies an initial assignment of insurance choice probabilities to the firm's corresponding employees. The individual probabilities segment the employee population into those who will take up ESI if offered, and those who will choose other forms of insurance depending on their Medi-Cal or Exchange eligibility. Our assumption of complete information implies that firms are similarly able to segment their employee population based on their projected take up of offered coverage. In line with current minimum participation requirements that insurers place on the group market, CalSIM assumes that firms with fewer than 50 employees will condition their offer on the

necessary 60 percent projected take up of offered ESI. Synthetic firms' final decisions to change offering behavior are ultimately responses to the direct pressures of changing cost structure of offering ESI vis-à-vis the applicable employer penalty and recompense to employees for premiums and cost sharing on the Exchange, and the indirect pressures of shifts in worker insurance take-up preferences.

5.2 Individual Decision

Once the firm's decision to offer or not offer ESI is determined, CalSIM simulates the decisions made by individuals and families, as HIEUs, to take up specific forms of health insurance coverage in response to eligibility determinations for the Exchange, Medi-Cal, or a firm's ESI offer. CalSIM uses a sequential cost-based approach that accounts for worker price elasticity of demand, the impact of chronic conditions, potential individual penalties, and the cost of insurance premiums relative to household income. Additionally, CalSIM assumes that decisions within HIEUs weigh all eligible insurance offers, allowing for alternating policy holders within the HIEU or additions of spouses or dependents to currently offered ESI plans.

When modeling years before 2018, CalSIM assumes that individuals become more likely to change to insurance options that are determined to be more cost-effective each year after 2014, as individuals adjust to the ACA implementation. This introduces a behavioral lag through a series of phase-in assumptions whereby a fraction of the predicted level of movement across insurance coverage types will be attained within each year. These phase-in assumptions vary by year, insurance type, and take-up scenario. These adjustments are applied to an individual's decision to switch coverage, following the determination that the change in coverage is advantageous to the individual.

In the base take-up scenario, to account for this behavioral lag, in 2014 CalSIM reduces Medi-Cal enrollment by 40 percent, Exchange take up among the uninsured by 50 percent, and Exchange take up among those with individually purchased plans by 20 percent compared to what the model would otherwise predict. The reduction for enrollment among the Exchange eligible population who are currently insured on the individual market is set to five percent from 2015 onwards. For Medi-Cal enrollment, we assume a reduction of realized enrollment due to behavioral lag as follows: 30 percent in 2015, 20 percent in 2016, 10 percent in 2017, and no reduction subsequently. For Exchange enrollment among the uninsured, we assume the following reductions: 37.5 percent in 2015, 25 percent in 2016, 12 percent in 2017, and no reduction subsequently.

The enhanced scenario draws on evidence from Massachusetts health care reform and establishment of the Commonwealth Health Insurance Connector Authority that enrollment

in most insurance types will reach full potential after just two years. Consequently, CalSIM assumes a shorter behavioral lag and posits enrollment at full potential by 2016. Specifically, we assume a reduction in potential Medi-Cal enrollment due to behavioral lag of 25 percent in 2014, 12.5 percent in 2015, and no reduction in 2016 onward. For behavioral lag in Exchange realized potential take up among the uninsured, we assume a 50 percent reduction in 2014, 25 percent in 2015, and no reduction in 2016 onward; and for Exchange take up among those with individually purchased insurance, 20 percent by 2014 and a stabilized 5 percent by 2015.

CalSIM simulates HIEU decisions by calculating the probability of take up for each insurance status available to the individual under the ACA: Medi-Cal/CHIP and other public (i.e. TRICARE), ESI, subsidized and unsubsidized Exchange, and uninsured. These probabilities are calculated for each individual based on the available insurance coverage offered by their employer, eligibility, and previous behavior. Particularly, the CalSIM model estimates specific individual (HIEU) take up functions conditional on the status quo insurance coverage status, making pairwise comparisons of different insurance options: for instance, one might be choosing between taking up coverage in the Exchange or staying uninsured. For undocumented immigrants, the probability of having insurance in the individual Exchange is zero, while other sources of coverage may have positive probabilities. The remainder of this section uses the distinction between status quo and post-ACA insurance status to describe the individual behavioral assumptions and decision models.

Medi-Cal enrollment decisions

Enrollment decisions vary due to status-quo Medi-Cal eligibility and insurance status. Specifically, CalSIM assumes that those currently eligible and enrolled in Medi-Cal or SCHIP will continue to be enrolled given that their eligibility remains intact and they have not displayed a preference for uninsurance. Thus, the probability of enrollment in Medi-Cal for those currently enrolled is equal to one.

Alternatively, those currently uninsured or currently enrolled on the individual market, newly eligible for Medi-Cal under the ACA, and subject to the individual penalty with incomes above the tax filing threshold are assigned the applicable individual penalty amount as a negative premium contribution (i.e., the penalty is subtracted from the premium amount to calculate a net premium cost). This assignment facilitates the take-up probability calculation using the Lewin Group (2003) multivariate logistic model of public insurance participation in the presence of a premium contribution requirement. Here, the probability of enrollment in Medi-Cal is dependent on individual-level characteristics, such as race and ethnicity and language, and calibrated using a constant factor to ensure a 61 percent take-up rate for the base scenario and 75 percent take-up rate for the enhanced scenario (as described below) across the newly eligible, uninsured population based on

current Medi-Cal enrollment experience. CalSIM also applies parameter estimates from the Lewin Group multivariate model to assign probabilities of Medi-Cal take up under the ACA to those who are currently uninsured but currently eligible for Medi-Cal. However, the calibrations include a premium elasticity to incorporate the revealed preference for uninsurance.

In cases where an employer continues to offer ESI and an individual becomes eligible for Medi-Cal due to the calculated MAGI for the household, the probability of take up is estimated as a function of individual elasticities of demand for insurance and the cost to take up either ESI or Medi-Cal. The balance of the estimated cost to take up ESI includes the individual's contribution to the offered plan, the estimated income tax savings from exempted income due to insurance contribution, adjustments for any shortfall in actuarial equivalence between the offered ESI plan and the available silver plan on the Exchange (which is calculated as a difference in premium), and adjustments for group premium discounts. Furthermore, CalSIM calibrates these probabilities to ensure a 12 percent take-up rate across the newly Medi-Cal eligible population who have a continued ESI offer.

Alternatively, in the cases where an employer does not continue to offer ESI and an individual becomes eligible for Medi-Cal, the probability of take up is estimated as a function of similar individual elasticities of demand for insurance as used for those who are uninsured. The probability of take up also accounts for the effective cost of the ESI plan if the ESI offer were to be continued as well as the individual's household income. The remaining cost to enroll in a continued ESI offer includes the individual's contribution assuming the offered benefits and premium structure for the ESI plan match, at a minimum, the silver plan found on the Exchange, adjusted for the cost of the individual penalty. CalSIM assumes that employers who drop coverage pass on all savings as part of the compensating wage effect described in Section 5.1. For those employees who have lost coverage due to an employer no longer offering ESI, we assume the additional wages are immediately allocated to the premium for health coverage.

Base versus enhanced take-up scenarios for Medi-Cal enrollment

To provide an interval estimate of new Medi-Cal enrollment due to the ACA Medicaid expansion, CalSIM models take up under 'base' and 'enhanced' scenarios (discussed previously with regard to behavioral lag).[20] In the base scenario, we assume that Medi-Cal

[20] The 'base' and 'enhanced' scenarios were adapted from the Kaiser Family Foundation (KFF) standard participation scenario developed by Holahan and Headen (2010). The KFF standard scenario assumes a take up rate of 57 percent among those newly eligible for Medi-Cal and a 10 percent take-up rate among those currently eligible but not enrolled; this scenario is designed to be similar to the approach employed by the Congressional Budget Office. The KFF enhanced scenario, on the other hand, assumes a 75 percent take-up rate among newly eligible and a 40 percent take-up rate among those previously eligible but not enrolled.

take-up among the uninsured that are newly eligible will match the current average take-up rate of 61 percent in California, with a 10 percent take-up rate among those previously eligible for Medi-Cal or Healthy Families but not enrolled, following the Holahan and Headen (2010) Kaiser Family Foundation (KFF) standard participation scenario.[21] Alternatively, in the enhanced scenario, we assume implementation of extensive strategies to encourage enrollment like simplification of eligibility determination, cultural sensitivity and language appropriate outreach, and 'no wrong door' enrollment procedures. These steps, as well as the minimum coverage requirement, support the CalSIM assumption of a 75 percent take-up rate among the newly eligible uninsured for Medi-Cal and a 40 percent take-up rate among those previously eligible but uninsured.

Employer sponsored insurance (ESI) enrollment decisions

For those currently offered and enrolled in ESI and for whom employers continue to offer coverage, the probability of take up is calculated relative to the take-up probabilities for any available offer on the Exchange, through Medi-Cal, and the probability of becoming uninsured. In this way, the probability to take up an ESI offer for those currently offered ESI is conditional on the calculated costs and savings of all alternative options.

Alternatively, for those currently offered ESI whose employers do not continue to offer coverage, the probability becomes a function of the effective cost for the previously-offered ESI coverage and the cost of an alternative plan on the Exchange. These calculations are conditional on whether the cost to the individual for a silver plan on the Exchange is 10 percent more or less than the cost to add the individual to any alternative ESI policy offered within the HIEU. In those cases where the cost for a silver plan on the Exchange is less than 110 percent of any alternative ESI offer, we assume the probability of ESI take up to be equal to zero.

For those with an individually purchased insurance plan whose employer offers coverage, ESI take up depends upon the non-group market premium and the cost to enroll. The non-group market premium calculation is found in Section 4.3.

ESI take up by the currently uninsured with an ESI offer depends on the individual penalty and the cost to take up. For those where the individual penalty is less than 75 percent of the cost to take up an ESI offer, the probability to take up the ESI offer is assumed to be decreased by 92 percent. Alternatively, for those where the individual penalty is more than 75 percent of the cost to take up an ESI offer, the probability to take up ESI is assumed to be decreased by only 25 percent. In this way, their decision incorporates their revealed

[21] Holahan, J and Headen I. Medicaid coverage and spending in health reform: national and state-by-state results for adults at or below 133% FPL. Kaiser Commission on Medicaid and the Uninsured Issue Brief; May 2010. Kaiser Family Foundation.

preference for uninsurance, but is allowed to respond to the individual penalty, which makes insurance coverage effectively less expensive for consumers.

Additionally, CalSIM compensates for auto enrollment typically found in the group market for those firms with 200 or more employees. Specifically, probability of ESI take up is inflated for full-time workers who are eligible for benefits and employers continue to offer coverage.

Exchange, subsidized and unsubsidized

In line with the ACA, CalSIM assumes that individuals eligible for Medi-Cal (with household income under 138 percent FPL) are not eligible for Exchange subsidies, which greatly decreases their probability of taking up in the Exchange. For those currently insured through ESI and whose employer no longer offers coverage, CalSIM estimates take-up probabilities through a cost calculation that includes the effective Exchange premium, household income, the additional income tax for increased wages passed on from the employer's decision to drop coverage, and the minimum coverage requirement penalty. As mentioned previously, CalSIM implicitly assumes premiums are discounted in the individual cost functions by the amount of the potential penalty were the individual to choose to become uninsured. Similar to the individual behavior assumptions used in estimating ESI take-up probabilities, these calculations are conditional on whether the cost to the individual for the silver plan on the Exchange is 10 percent more or less than the cost to add the individual to any alternative ESI policy offered within the HIEU.

Alternatively, CalSIM estimates the take up probabilities of those currently insured through ESI whose employer continues to offer ESI as a function of savings the individual will gain through the Exchange (including any applicable subsidies that decrease premium contributions), the ESI group premium, household income, and any gap in actuarial equivalence between the ESI plan and the Exchange silver plan. To account for inertia in individual behavior centered on current insurance coverage as well as risk preferences for employer based plans, CalSIM assumes that even among those who would observe substantial financial gain by switching from ESI to the Exchange there is a 10 percent chance they will remain with ESI.

CalSIM models the individual decisions of the currently uninsured to take up coverage through the Exchange as a function of the Exchange sliver plan premium, the individual penalty, household income, and individuals' limited English proficiency (LEP).[22]

[22] CalSIM defines LEP as "those speaking English less than very well." Individuals reporting in MEPS that they were uncomfortable speaking English were classified as LEP. To determine LEP for those non-English speakers reporting comfort speaking English but may be limited in terms of LEP, the CalSIM model uses a probabilistic model fit to the 2009 California Health Interview Survey (CHIS). The model includes a variety

For those individuals currently insured by a non-group plan on the individual market without an ESI offer, CalSIM maintains their revealed preference for maintaining insurance and assigns a 100 percent probability of take up on the Exchange. The designation of take up in the Exchange with subsidies, and the corresponding level of subsidies, is contingent on eligibility. Furthermore, CalSIM does not differentiate between plans obtained through the Exchange without subsidies and plans obtained through the individual market.

For those individuals eligible for catastrophic plans offered through the Exchange, CalSIM employs an additional cost comparison within each Exchange take up probability calculation to account for the financial incentives of the lower premium and lower actuarial plan option.

Lastly, CalSIM assumes that individuals with chronic conditions are susceptible to adverse selection and are therefore less sensitive to increases in price. To account for this, we allow for the price elasticity of demand for insurance to vary between non-chronically ill and chronically ill individuals. Consequently, holding all else equal, we assume that the non-chronically ill have price elasticity 50 percent higher than the chronically ill.

Uninsured

For the currently uninsured, the probability of continuing to be uninsured is assumed to be the residual probability conditional on all alternative insurance coverage options. This assumption derives from the individual's revealed preference for uninsurance, the structure of the Exchange in transitioning those currently enrolled on the non-group market into Exchange plans, and the influence of the minimum coverage requirement penalty. Similarly, those currently enrolled on Medi-Cal, as discussed previously, and those currently enrolled in other public coverage are assumed to continue to receive their current health insurance and therefore have a probability of becoming uninsured of zero.

Aggregate estimates of insurance coverage

The function of the probability calculation is to provide conditional probabilities of take up among the available insurance coverage options for each individual and HIEU in the CalSIM decision set. However, given the relative nature of each probability, individuals are not assigned a specific insurance coverage choice for each person. Instead, CalSIM estimates enrolled populations in each insurance coverage type post-ACA by deriving weighted sums of the relative probabilities across individuals. This allows for aggregate estimates of

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of factors associated with LEP populations as predictors, including language spoken at home, survey interview language, race/ethnicity, level of education, and age at which the individual moved to the United States (if not U.S. born). To account for the effect of LEP status on coverage take up, we incorporate the findings of a 2006 study on insurance take up among Asians and Latinos (Alegria et al. 2006).

insurance coverage without requiring each individual to make a simulated decision to join one mutually exclusive category.

6 Limitations and Sensitivity

The analyses and methods presented here are based on a modeling process using multiple data sources that carry their own limitations. The MEPS-HC, MEPS-PRPL, CHIS, and EHBS data sets are all surveys using a stratified random sample and population weights to calculate aggregated results representative of the populations surveyed. While reweighting MEPS-HC and MEPS-PRPL to replicate California's population based on CHIS weights improved our ability to release California-specific findings that take characteristics of Californians into account when modeling the response to ACA, it is potentially biased by the sampling strategies, non-response bias, or other problems with using survey data and self-reported health care costs for these purposes. Alternatively, our behavior assumptions and cost-based take-up calculations may not fully account for the non-monetary influences of insurance coverage decisions (e.g., risk aversion, individual utility gained from seamless coverage, employer utility functions concerned with employee welfare). CalSIM is also subject to the limitations in our chosen cost and elasticity based functional forms. Additionally, CalSIM is sensitive to the relative inflation rates that we employ, both the population inflation rates and income and medical cost inflation rates.

7 Version History and Related Publications

Version 1.1

In Version 1.1, the enhanced take-up rate was used exclusively to predict Medi-Cal take-up rate. As discussed in Section 5.2, under the enhanced take-up rate 75 percent of the newly Medi-Cal eligible uninsured population would enroll, while 40 percent of the existing Medi-Cal eligible but not enrolled uninsured would enroll in the program. This assumption increased the number of Medi-Cal beneficiaries in comparison to future versions of the model.

> Presentation to the California Health Benefit Exchange Board by Dr. Gerald F. Kominski, UCLA Center for Health Policy Research on May 11th, 2011. "The Potential Impact of the Affordable Care Act on California:" http://www.healthexchange.ca.gov/Documents/Agenda%20Item%20IX%20-%20Potential%20Exchange%20Enrollment%20-%20Kominski.pdf

Version 1.2

In Version 1.2, we continue to use the enhanced take up rate for Medi-Cal take up as the default, as seen in Version 1.1. Additionally, several enhancements were made to integrate finer and more complex assumptions of individual and firm behavior.

> Jacobs K, Graham-Squire D, Roby DH, Kominski GF, Kinane CM, Needleman J, Watson G, and Gans D. 2011. *Proposed Regulations Could Limit Access to Affordable Health Coverage for Workers' Children and Family Members*. Policy Brief, UC Berkeley Center for Research on Labor and Employment. http://laborcenter.berkeley.edu/healthcare/Proposed_Regulations11.pdf

Version 1.3

In Version 1.3, we returned to using the standard take up scenario as our default Medi-Cal enrollment assumption and employed a 7.5 percent premium inflation rate, which was later reduced to 6.5 percent following consultation with the Congressional Budget Office. Additionally, we implemented a chronically ill dimension to the price elasticity of demand factors in the Exchange, subsidized and unsubsidized, take up probability calculations. These enabled us to more precisely estimate the effect of adverse selection in the Exchange and individual market should the requirement to purchase insurance, or individual mandate, not be implemented with the remainder of the ACA.

Kominski GF, Roby DH, Jacobs K, Watson G, Graham-Squire D, Kinane CM, Gans D, and Needleman J. 2012. *Newly Insured Californians Would Fall by More than 1 Million under the Affordable Care Act without the Requirement to Purchase Insurance*. Policy Note, UCLA Center for Health Policy Research. http://healthpolicy.ucla.edu/publications/Documents/PDF/calsim_mandate.pdf

Version 1.4

Version 1.4 was an internal version to test parameters and assumptions, introduce weighting procedures to replace the 2009 CHIS with the American Community Survey for income distribution weights necessary for detailed regional estimates, and fine tune our premium contribution calculations.

Version 1.5

In Version 1.5, we included a predictive analysis to estimate the behavior of California's limited English proficient (LEP) population, defining LEP as "those speaking English less than very well." The core data set for CalSIM does not contain data on English proficiency but does contain information that indicates one's comfort level with speaking English. Individuals reporting that they were uncomfortable speaking English were classified as LEP. To determine LEP for the remainder of respondents, the CalSIM model uses a probabilistic model fit to the 2009 California Health Interview Survey (CHIS). The model includes a variety of factors associated with LEP populations as predictors, including language spoken at home, survey interview language, race/ethnicity, level of education, and age at which the individual moved to the United States (if not U.S. born). This model also controls for gender, income, employment status, employer firm size, ability to understand primary care provider, and immigration status.

To account for the effect of LEP status on coverage take-up, we incorporate the findings of a 2006 study on insurance take up among Asians and Latinos (Alegria et al. 2006). The LEP-specific effects found in this study are used to model the difference in insurance take-up among Latino and Asian populations due to LEP.

Gans D, Kinane CM, Watson G, Roby DH, Graham-Squire D, Needleman J, Jacobs K, Kominski GF, Dexter D, and Wu E. *Achieving Equity by Building a Bridge from Eligible to Enrolled*. Los Angeles, CA: UCLA Center for Health Policy Research and California Pan-Ethnic Health Network, 2012. http://healthpolicy.ucla.edu/publications/Documents/PDF/enrolledpbfeb2012.pdf

Version 1.6

In Version 1.6, we introduced phase-in assumptions for the enhanced scenario that were informed from the Massachusetts reform experience and the institution of the Commonwealth Health Insurance Connector Authority. These phase-in assumptions proscribe that enrollment will reach full potential take up within two years rather than the original four years. CalSIM also underwent additional fine tuning of behavioral assumptions to accommodate more detailed demographic analysis of insurance coverage under the ACA.

> Presentation to the California Health Benefit Exchange Board by Ken Jacobs, UC Berkeley Center for Labor Research and Education on March 22nd, 2012. "Health Insurance Coverage in California under the Affordable Care Act:" http://www.healthexchange.ca.gov/BoardMeetings/Documents/UC%20Exchange%20Board%20Mtg%20Presentation%203-22-12%20v5.pdf

Version 1.7

Version 1.7 introduced the Basic Health Program as a policy option, and incorporated slight refinements to Medi-Cal eligibility determination enabling more accurate projections of Medi-Cal enrollment.

> Jacobs K, Watson G, Kominski GF, Roby DH, Graham-Squire D, Kinane CM, Gans D, and Needleman J. 2012. *Nine Out of Ten Non-Elderly Californians Will Be Insured When the Affordable Care Act is Fully Implemented*. Policy Brief, UC Berkeley Center for Research on Labor and Employment. http://healthpolicy.ucla.edu/publications/Documents/PDF/calsim_Exchange1.pdf

> Jacobs K, Graham-Squire D, Kominski GF, Roby DH, Pourat N, Kinane CM, Watson G, Gans D, and Needleman J. 2012. *Predicting Exchange Enrollment with Subsidies under the Affordable Care Act: Regional and County Estimates*. Fact Sheet, UC Berkeley Center for Research on Labor and Employment. http://laborcenter.berkeley.edu/healthcare/aca_fs_exchange.pdf

> Jacobs K, Graham-Squire D, Kominski GF, Roby DH, Pourat N, Kinane CM, Watson G, Gans D, and Needleman J. 2012. *Predicting Increase in Medi-Cal Enrollment under the Affordable Care Act: Regional and County Estimates*. Fact Sheet, UC Berkeley Center for Research on Labor and Employment. http://laborcenter.berkeley.edu/healthcare/aca_fs_exchange.pdf
> Jacobs K, Graham-Squire D, Kominski GF, Roby DH, Pourat N, Kinane CM, Watson G, Gans D, and Needleman J. 2012. *Remaining Uninsured in California under the*

Affordable Care Act: Regional and County Estimates. Fact Sheet, UC Berkeley Center for Research on Labor and Employment.
http://laborcenter.berkeley.edu/healthcare/aca_fs_uninsured.pdf

Kominski GF, Jacobs K, Roby DH, Graham-Squire D, Kinane CM, Watson G, Gans D, and Needleman J. 2012. *Health Insurance in California under the Affordable Care Act*. Chart Pack, UC Berkeley Center for Research on Labor and Employment.
http://laborcenter.berkeley.edu/healthcare/aca_chartpack.pdf

Estimating the Change in Coverage in California with a Basic Health Program. Memorandum, August 2012. UC Berkeley Center for Research on Labor and Employment.
http://laborcenter.berkeley.edu/healthcare/ca_basic_health_program12.pdf

Jacobs K, Graham-Squire D, Gould E, Roby DH. 2012. *Minimizing Families' Health Care Subsidy Repayments Due to Income Volatility.* Findings, California Program on Access to Care.
http://healthpolicy.ucla.edu/programs/health-economics/projects/CalSIM/Documents/SubsidyRepaymentCPAC1.pdf

Version 1.8

In Version 1.8 we added the capability to model ACA implementation without the Medicaid expansion, a policy option created by the Supreme Court in its June 2012 ruling. Additional research focused on the impact of the individual mandate on Californians and those who will remain uninsured after the ACA has been implemented.

Lucia L, Jacobs K, Dietz M, Graham-Squire D, Pourat N, and Roby DH. 2012. *After Millions of Californians Gain Health Coverage under the Affordable Care Act, Who Will Remain Uninsured?* Policy Brief, UC Berkeley Center for Research on Labor and Employment.
http://laborcenter.berkeley.edu/healthcare/aca_uninsured12.pdf

Lucia L, Jacobs K, Watson G, Dietz M, and Roby DH. 2013. *Medi-Cal Expansion under the Affordable Care Act: Significant Increase in Coverage with Minimal Cost to the State.* Policy Brief, UC Berkeley Center for Research on Labor and Employment.
http://laborcenter.berkeley.edu/healthcare/medi-cal_expansion13.pdf

Roby DH, Watson G, Jacobs K, Graham-Squire D, Kinane CM, Gans D, Needleman J, Kominski GF. 2013. "Modeling the Impact of the Affordable Care Act and the Individual Mandate on Californians." *Journal of Family and Economic Issues*, March 2013, 34(1): 16-28.
http://link.springer.com/article/10.1007/s10834-012-9349-5

CalSIM Version 1.8 Statewide Data Book 2014-2019
http://healthpolicy.ucla.edu/programs/health-economics/projects/CalSIM/Documents/CalSIM_Statewide.pdf

CalSIM Version 1.8 Regional Data Book 2014 and 2019
http://healthpolicy.ucla.edu/programs/health-economics/projects/CalSIM/Documents/CalSIM_Regional.pdf