The following appendices are supplemental to a Commonwealth Fund report, Christine Eibner and Sarah A. Nowak, *The Effect of Eliminating the Individual Mandate Penalty and the Role of Behavioral Factors* (Commonwealth Fund, July 2018), https://www.commonwealthfund.org/publications/fund-reports/2018/jul/eliminating-individual-mandate-penalty-behavioral-factors.

APPENDIX 1. SCENARIOS DESCRIBING POSSIBLE RESPONSES TO THE INDIVIDUAL MANDATE

Scenario	Description	Linear penalty response	Taste for compliance	Share unaware of exemptions	Perceived chance of paying penalty	Inertia in decision-making	Welcome-mat effect persists?	CSRs paid by federal government?
1. Base	People respond by weighing costs and benefits; mirrors assumptions used in prior COMPARE work	Yes	No	0%	80%	No	Yes	No
2. Taste for compliance	Replaces linear penalty response with assumption that people will pay a lump-sum amount to avoid the penalty	No	Yes	0%	80%	No	Yes	No
3. Age-based taste for compliance	Replaces linear penalty response with lump-sum factors that increase with age	No	Yes, increases with age	0%	80%	No	Yes	No
4. Unaware of exemptions	Assumes 20% of people who are eligible for exemptions are unaware and hence respond to the penalty	Yes	No	20%	80%	No	Yes	No
5. Low probability of paying penalty	Assumes people expect to pay only half of penalties owed, on average	Yes	No	0%	50%	No	Yes	No
6. Inertia in decision-making	People value sticking with status quo choice, regardless of costs/benefits	Yes	No	0%	80%	Yes	Yes	No
7. Welcome-mat effect tied to mandate	Welcome-mat effect dissipates after mandate penalty is removed	Yes	No	0%	80%	No	No	No
8. CSRs paid	Assumes federal government pays CSRs	Yes	No	0%	80%	No	Yes	Yes
9. Combined scenario A	Combines behavioral factors considered individually in prior scenarios	Yes	Yes, increases with age	20%	50%	No	No	No
10. Combined scenario B	Combines behavioral factors considered individually in prior scenarios	Yes	Yes, same for all ages	20%	50%	Yes	Yes	No

Notes: Detailed information on these adjustments, including an equation describing the penalty response, can be found in Appendix 2. When CSRs are not paid by the federal government, we assumed they are loaded onto the cost of silver plans.

APPENDIX 2. COMPARE OVERVIEW

COMPARE is a microsimulation model that uses economic theory, nationally representative data, and evidence from experience to estimate how consumers and businesses will respond to health policy changes.[1] The model creates a synthetic population of individuals, families, health expenditures, and firms using data from the April 2010 wave of the 2008 Survey of Income and Program Participation, the 2010–2011 Medical Expenditure Panel Survey (MEPS), and the 2009 Kaiser Family Foundation/ Health Research and Educational Trust Employer Health Benefits Survey. While the data sources predate the implementation of the Affordable Care Act (ACA), we update them to reflect population growth based on factors reported by the U.S. Census Bureau, and to reflect health care cost growth using the Centers for Medicare and Medicaid Services (CMS) National Health Expenditure Accounts. In addition, we have adjusted them to ensure they accurately reproduce post-2014 outcomes (more on this below).

We assign each individual in the Survey of Income and Program Participation a spending amount using the spending of a similar individual from MEPS. We then augment spending imputations with data on high-cost claims from the Society of Actuaries. These adjustments account for the fact that MEPS underrepresents individuals with high spending.

Individuals in COMPARE make health insurance enrollment decisions by weighing the costs and benefits of available options, an approach that is referred to by economists as "utility maximization." The utility-maximization framework accounts for the following:

- Premium costs
- Anticipated out-of-pocket health care spending
- The value of health care consumption
- The risk of incurring a financially devastating health care bill, and
- Any penalties the individual would face by remaining uninsured, including the risk of facing denial or being charged higher premiums at a later date.

Premium costs are adjusted to account for tax credits, if such credits are available to the enrollee. All else being equal, higher premiums reduce an individual's probability of enrolling in health insurance. In contrast, several factors encourage enrollment, such as a lower risk of catastrophic spending, reduced out-of-pocket spending, the avoidance of penalties, and increases in health care utilization.

Businesses in the model make decisions by considering the value of health insurance to their workers. Tax credits for individual market coverage and Medicaid eligibility expansions may reduce the value of health insurance to workers, leading firms to drop insurance. However, mandates requiring individuals to enroll in insurance, as well as mandates requiring firms to offer coverage, tend to increase the likelihood that a firm will offer insurance.

While the data that feed into the model are relatively old, we have adjusted the model to ensure that we accurately predict outcomes for post-2014 years including overall enrollment by source of coverage, the share of marketplace enrollees receiving tax credits, and total Advanced Premium Tax Credit (APTC) spending. The most important adjustments that we have added include incorporating the welcome-mat effect, down-weighting the mandate penalty by 0.80 to reflect tax noncompliance, and adding an adjustment factor to account for the fact that some APTC-eligible individuals may be unaware of these subsidies.

Below, we describe the health insurance enrollment algorithm used in the base COMPARE scenario, as well as recent adjustments to the model that we have incorporated to better match post-ACA experience (e.g., administrative reports on enrollment, subsidy payments, and tax collections). We then describe how we modeled each of the additional individual mandate response scenarios discussed in the main text. Finally, we present additional modeling results, and discuss how our results compare to those of the Congressional Budget Office (CBO) and the Urban Institute.

Health Insurance Enrollment Decisions

To model individual and family health insurance enrollment decisions under the ACA, COMPARE uses a utility-

maximization approach, in which decision-makers weigh the costs and benefits of available options. The utility-maximization framework accounts for the tax penalty for not purchasing insurance, the value of health care consumption, premium costs, expected out-of-pocket health care spending, and financial risk associated with out-of-pocket spending.

We scale each of these components of utility to dollars and assume that they are additively separable.[2] We further assume that individuals' utilities are separable in consumption and health. The health-related component of the utility function is modeled as follows:

$$U_{ijk} = u(H_{ij}) - E(OOP_{ij}) - p_{ij}^{(H)} - \frac{1}{2} rVAR(OOP_{ij}) - R_{ij} + Calibration_{jk}$$

Within this equation:

$u(H_{ij})$ is the utility associated with consuming health care services for individual i under insurance option j

k represents an individual's demographic group based on age and income

OOP_{ij} is the out-of-pocket spending expected

$p^{(H)}$ is the individual's premium contribution (after adjusting for tax credits)

r is the coefficient of risk aversion.

Possible health insurance enrollment choices (j) under the ACA may include employer coverage, Medicaid or Children's Health Insurance Program (CHIP) coverage, an ACA-compliant individual-market plan (including plans available on and off the marketplaces), or another source of coverage.[3] Individuals also can choose to forgo insurance. Not all individuals will have access to all forms of coverage. For example, access to Medicaid is contingent on eligibility, and individuals will have access to employer coverage only if they (or their spouse or parent) work for a business that offers insurance.

The **Penalty** response term, R_{ij} represents the individual's response to the tax penalty associated with insurance status j, and — in scenarios in which the mandate is in effect — it is 0 for all but the uninsured insurance status and on so-called "short term" nongroup plans. When j refers to a short-term plan or uninsurance, R_{ij} is given by:

$$R_{ij} = 1_{Ci}(1 - 1_{Ei}) \left[\alpha_L Penalty_i + \alpha_C + \frac{\alpha_A(\max(18, age_i) - 18)}{46} \right]$$

In this equation, 1_{Ci} is an indicator for whether individual i complies, 1_{Ei} is an indicator for whether individual i is exempt *and* aware that he/she is exempt. $Penalty_i$ is the penalty that individual i owes, or would owe if not exempt. The variable α_L describes the weight put on the linear response to the penalty amount. We typically use a value of $\alpha_L = 0.8$ to capture the fact that, on average, the Internal Revenue Service collects only about 80 percent of taxes owed.[4] In some scenarios, we decrease this to 50 percent (see "Perceived Chance of Paying Penalty" in Appendix 1). The parameter α_C describes a taste for compliance that does not depend on age, and α_A is the magnitude of the age-based taste for compliance.

The term $\mathbf{Calibration_{jk}}$ is a factor that adjusts utilities to match enrollment patterns observed in pre-ACA data. The term accounts for nonpecuniary factors that may influence preferences for different types of insurance. Such factors include the convenience associated with enrolling in employer coverage and access constraints associated with Medicaid. Specific modeling strategies for each source of coverage j are described next.

Small-group employer coverage. Small employers in the model choose whether to offer coverage based on worker preferences and a small set of other factors, including the employer's industry and whether workers are unionized. Under the ACA, all small firms are part of a single risk pool with guaranteed issue, three-to-one rate banding on age, and restrictions that preclude insurers from charging different premiums to different groups other than based on geography, family size, tobacco use, and plan generosity.

In the current version of the model, small-group market regulations apply to all firms with 50 or fewer employees, regardless of year. Earlier versions of the model expanded the small-group market to include firms with 100 or fewer workers after 2015, as originally intended by the ACA. We revised the definition because the Protecting Affordable

Coverage for Employees Act, signed into law in late 2015, amended the ACA's definition of a *small employer* to include firms with one to 50 employees in perpetuity, unless states opt to extend the small-group market to firms with up to 100 workers.

Small firms in the model are permitted to purchase a 60-percent, 70-percent, 80-percent, or 90-percent actuarial value plan on the ACA's regulated small-group market, which includes the Small Business Health Options Program (SHOP) marketplaces. Small firms in the model may retain grandfathered status, which exempts them from the ACA's rating regulations, although we assume that a certain percentage of small firms will lose grandfathered status each year.

The ACA also offers a small business tax credit to small firms with low-wage workers who obtain coverage through the SHOP marketplaces. Because firms can take advantage of these credits for only two years, we assume that all small firms will have exhausted their tax credit eligibility by 2020.

Large-group employer coverage. Like small employers, large employers choose whether to offer coverage based on worker preferences and several other characteristics, including union status and industry. We allow large firms that offer coverage to choose between four different plans, which are distinguished by plan generosity and rated based on enrollees' expected health expenditures. We estimate premiums for the large-group market based on a regression. The firm's decision to offer is modeled using structural econometric techniques.

Medicaid. Through our calibration process, the model accounts for the fact that not all Medicaid-eligible individuals chose to enroll, perhaps because of stigma, lack of information, or transaction costs associated with enrolling. To account for the fact that the ACA increased Medicaid enrollment among the previously eligible population,[5] we increase the calibration parameter by a factor of approximately $200 in the post-2014 period. While we account for the individual mandate separately, it is possible that this welcome-mat parameter is picking up some nonfinancial effects of the individual mandate, such as increased enrollment because of exempt individuals mistakenly believing they are subject to the mandate.

Individual market. To model short-term plans for this analysis, we model the individual market as consisting of two components: 1) the ACA-compliant individual market, including the marketplaces, and 2) off-marketplace short-term plans that are not required to comply with the ACA's rating or other requirements. In the ACA-compliant individual market, modeled individuals and families can purchase plans with a 60-percent, 70-percent, 80-percent, or 90-percent actuarial value, corresponding to bronze, silver, gold, and platinum plans on the marketplaces, respectively. We model short-term plans as having an actuarial value of 50 percent, consistent with estimates of the actuarial value of health insurance plans prior to the ACA.[6] We do not model catastrophic plans, which are available only to those under age 30 or who qualify for a hardship exemption from the individual mandate — partially because the actuarial value of bronze plans and catastrophic plans are virtually the same. According to a 2015 fact sheet published by CMS, less than 1 percent of all marketplace enrollees have selected catastrophic coverage.[7]

ACA-compliant individual market premiums are calculated endogenously in the model based on the health expenditure profile of those who choose to enroll. The total, unsubsidized premium is based on enrollees' age, smoking status, and market-rating reforms implemented under the ACA.[8] We model three-to-one rate banding on age for adults age 21 and older, with a separate age-band for children and young adults under age 21. We also account for the ACA's risk-adjustment requirements, which transfer funds from plans with lower-than-average actuarial risk to plans with higher-than-average actuarial risk.

Under the ACA, the actual premium an enrollee pays is adjusted to account for tax credits available to qualifying individuals with incomes between 100 percent and 400 percent of the federal poverty level (FPL) who do not have affordable offers of insurance from another source (e.g., employer coverage, Medicaid). We apply the ACA's subsidy formula using the benchmark silver premium and the individual's income. Eligible individuals who have incomes between 100 percent and 250 percent of FPL also can receive CSR subsidies that help to lower out-of-pocket spending. As required by the ACA, individuals who receive CSR subsidies in COMPARE must be tax-credit eligible and purchase a silver plan (70% actuarial value). With the CSR subsidies,

the effective actuarial value of the plan is increased to 94 percent if income is below 150 percent of FPL, 87 percent if income is between 150 percent and 200 percent of FPL, and 73 percent if income is between 200 percent and 250 percent of FPL. Accordingly, out-of-pocket spending is adjusted downward to reflect the higher actuarial value of the plan. Note that out-of-pocket spending enters the individual's utility function; hence, individuals receiving CSR subsidies are more likely to purchase coverage.

Adjustment to Account for Post-ACA Experiences and Policies

CSRs. Given the Trump administration's intention at the time of this writing to halt federal payments for CSRs, we assume in the model that insurers build the costs of the CSR payments into premiums for their silver plans. We take this into account in COMPARE by eliminating CSR payments from the federal government and loading the costs of CSRs onto the premiums of silver nongroup market plans. Individuals who would have previously been eligible to receive CSR subsidies continue to do so.

Awareness of marketplace tax credits. The U.S. Department of Health and Human Services reported that approximately 14 percent of individual market enrollees are eligible for tax credits but forgo those credits by purchasing coverage outside of the marketplaces.[9] HHS further estimates that 9 million people are potentially eligible for tax credits but remain uninsured. Because these findings suggest that some people may be unaware of their tax credit eligibility, we assume that 25 percent of tax-credit eligible individuals will not account for these credits in their health insurance enrollment decisions. With this assumption, we match HHS's estimate that approximately half of all individual market enrollees receive tax credits.

Penalty payments. We adjusted the distribution of individual mandate penalty payments among individuals with incomes above 400 percent of FPL to better match data published by the IRS.[10] This adjustment required us to reduce penalty payments among very-high-income individuals and increase them for individuals just above 400 percent of FPL. We did not alter the distribution of payments among lower-income individuals.

New rating curve. In May 2017, CMS updated the default age rating curve to adjust premium rating factors for children and young adults age 20 and under.[11] We use the revised rating curve in this analysis.

Scenarios Considered in This Report

Next, we describe how we adjust the decision-making approach detailed above to reflect the alternative scenarios used in the report. For the most part, the scenarios change a single aspect of the base COMPARE scenario; for example, scenario 2 replaces the linear response to the penalty used in the main model with a taste for compliance. However, scenarios 9 and 10 combine aspects of the prior scenarios.

1. **Base.** In this scenario, which we have used in recent previous COMPARE analyses, people respond to a linear penalty but down-weight the probability of paying by a factor of 0.80 (i.e., α_L=0.80). We assume that 1_{ci}=1 and I_{Ei}=α_c=α_A=zero. The penalty response function is hence given by: (R_{ij}=*0.80*penalty*$_i$). We assume the welcome-mat effect persists after the mandate penalty is removed.
2. **Taste for compliance.** We assume 1_{ci}=1 and I_{Ei}=α_L=α_A=zero, and that there is taste for compliance (α_c) equal to $886 per year. This amount is based on Saltzman,[12] who estimated that people are willing to pay approximately $67 per month ($804 per year) to avoid being out of compliance with the mandate. Saltzman found no evidence for a separate response to the penalty that scales with size. We estimate an annual taste for compliance in 2020 of $886 after adjusting Saltzman's estimate for inflation. We assume the welcome-mat effect persists after the mandate penalty is removed.
3. **Age-based taste for compliance.** In addition to the mandate penalty response, we add age-specific taste-for-compliance factors to the utility associated with being insured. Mathematically, we assume that 1_{ci}=1, I_{Ei}=α_c=zero, α_L=0.80, and α_A=$1,772. With this value of $\alpha_{A,}$ the taste for compliance ranges from $0 for people age 18 and under to $1,772 for a 64-year-old. A person in the middle of the age range (a 41-year-old) would experience the same taste for compliance

($886) as in the non-age-based scenarios. This scenario corresponds to the discussion in Auerbach et al.,[13] which posits that people may respond both to the size and the presence of the mandate, and that the desire to comply with the law may be stronger for older individuals. We assume the welcome-mat effect persists after the mandate penalty is removed.

4. **Unaware of exemptions.** We assume that 20 percent of people who are eligible for exemptions are unaware, and hence respond to the penalty even though it does not apply to them. Mathematically, 1_{ci}=1, 1_{Ei}=0.20, α_L=0.80, and α_c=α_A=zero, This scenario reflects findings that people generally have low health literacy, and that data from the IRS show that, in 2015, roughly 313,000 low-income people erroneously paid a penalty when they likely were exempt from the mandate.[14] We assume the welcome-mat effect persists after the mandate penalty is removed.

5. **Low probability of paying penalty.** As described in the base scenario, the default assumption in COMPARE is that people expect to pay, on average, 80 percent of penalties owed. In this scenario, we reduce the expected payment ratio to 50 percent. Hence, α_L=0.50, 1_{ci}=1, and 1_{Ei}=α_c=α_A=zero. This reflects the possibility that people expect weak enforcement of the penalty, for example because of limitations on how funds can be collected. We assume the welcome-mat effect persists after the mandate penalty is removed.

6. **Inertia in decision-making.** To account for decision-making inertia, we increase individuals' utilities in the scenarios where the individual mandate penalty is removed for the health insurance options they are enrolled in under the scenarios in which the individual mandate is in place. We do this by increasing the value of $u(H_{ij})$ for the health insurance status the individual has with the individual mandate in place by two-thirds. The mandate penalty response function is the same as in the base scenario, and we assume the welcome-mat effect persists after the mandate penalty is removed.

7. **Welcome-mat effect dissipates.** Data indicate that the ACA led to increased take-up of Medicaid among those who were already eligible, a phenomenon known as the "welcome-mat effect."[15] There are many factors that may cause previously eligible people to newly enroll, including increased awareness, outreach and enrollment initiatives, prodding from providers, and streamlined application processes required by the ACA. Many of these factors, such as the streamlined application process, may persist after the individual mandate penalty is eliminated. Other factors, such as awareness of the law and the intensity of enrollment outreach, may be influenced by the mandate. It is also possible that some of the welcome-mat effect is itself driven by the mandate — e.g., because a subset of the previously eligible population could face mandate penalties if uninsured, because some of this population erroneously believes that the mandate applies to them, or because people in this income range are not sure whether their year-end income will be above or below the filing threshold. Although the welcome-mat effect has been well documented, we are unaware of research that has isolated the specific behavioral factors that contribute to this effect, making it difficult to determine the degree to which the effect will persist after the individual mandate penalty is eliminated. While our base scenario assumes the welcome-mat effect remains after the individual mandate penalty is removed, this scenario assumes it fully dissipates. To operationalize this effect, we remove the $200 increment to the Medicaid calibration parameter ($calibration_{Medicaid,k}$) that we added to better reflect post-2014 enrollment levels. We use the same penalty response function as in the base scenario.

8. **CSRs paid.** In this scenario, we assume that CSRs are fully paid by the federal government. While this assumption is inconsistent with the Trump administration's current policy, CBO assumed CSRs would be paid in its most recent complete analysis of the effect of removing the mandate penalty.[16] The mandate penalty response function is the same as the base scenario, and we assume the welcome-mat effect persists after the mandate penalty is removed.

9. **Combined scenario A (CSRs not paid).** This scenario combines aspects of the prior scenarios. Specifically, we add an age-based taste for compliance (α_A=$1,772), assume 20 percent of eligible people are unaware of exemptions (1_{Ei}=0.20), include a linear response to the penalty but assume that people expect to pay 50 percent of penalties owed (α_L=0.50), and allow the welcome-mat effect to dissipate after the mandate penalty is removed. We assume 1_{Ci}=1 and α_C=0; hence, the penalty response function is as follows: 0.80*{(0.50*penalty$_i$)+[38.52*(max(18,age$_i$)-18)]}. Consistent with the current policy of the Trump administration, we assume CSRs are not paid by the federal government, and hence costs are loaded onto the silver plan.

10. **Combined scenario B (CSRs not paid).** This scenario is similar to combined scenario A above, but we add a lump-sum taste for compliance (as opposed to the age-based taste for compliance), allow for inertia in decision-making, and allow the welcome-mat effect to continue after the mandate penalty is removed. We model the inertia effect as in scenario 6. The penalty response function is as follows. {0.80*[(0.50*penalty$_i$)+$886]}. We assume CSRs are not paid by the federal government, and hence costs are loaded onto the silver plan.

Sensitivity to Assumptions About Compliance

In the scenarios analyzed in the main text, we assume that everyone down-weights the probability of paying the mandate penalty by a factor of α_L, but no one expects with certainty to fully evade the penalty (1_{Ci}=1). We make this assumption because we think it is unlikely that people will know with certainty whether they will be able to fully avoid the mandate, but many people may expect, on average, to be able to escape some of the penalty. As an alternative, we might assume that some people expect to fully avoid the penalty while others expect to pay the entire amount. In Exhibit A1, we consider a sensitivity analysis in which we assume that 80 percent of people subject to the mandate expect to pay the full penalty, while the remaining 20 percent of people expect to avoid the penalty entirely. Hence, 1_{ci}=0.80, α_L=1, and I_{Ei}=α_c=α_A=zero. Overall, results from this scenario are very similar to the base scenario.

Exhibit A1. Sensitivity to Assumptions About Compliance

	Base: Everyone down-weights mandate penalty by 80%	Alternative: 20% of people expect to fully avoid penalties	Difference
Insurance enrollment (millions), 2022			
ESI	157.3	157.1	–0.1%
Individual market	19.2	19.4	1.3%
Medicaid	61.5	61.4	–0.2%
Other	12.5	12.5	0.0%
Uninsured	27.7	27.8	0.3%
Indivdual market premiums, 2020			
Bronze premium for 40-year-old	$4,655	$4,592	–1.4%
Silver premium for 40-year-old	$7,283	$7,218	–0.9%

Data: RAND COMPARE microsimulation model.

Notes: Insurance enrollment numbers are for people under age 65. Numbers are estimates. ESI = employer-sponsored insurance.

Comparison to CBO and the Urban Institute

Exhibit A2 compares our insurance estimates with and without the mandate to those of CBO and the Urban Institute. The CBO estimates presented in the table come from its' November 2017 report, which focused specifically on eliminating the individual mandate. Since then, CBO has revised its estimates, but it has not published updated analyses that isolate the effect of removing the individual mandate penalty from other modeling and policy changes implemented in the most recent report.[17]

The analyses presented in Exhibit A2 are not comparable regarding the treatment of CSRs — CBO assumes CSRs are paid by the federal government both with and without the mandate. Urban, in contrast, compares policies in place at the end of 2016 to policies that will be in place in 2019. Urban, thus, compares a scenario in which the both the mandate is in place and CSRs are paid, to a scenario in which the mandate penalty is eliminated and CSRs are halted. Another difference across the estimates is that RAND and Urban assign individuals to a primary insurance category, while CBO allows people to have more than one source of coverage. Hence, CBO's estimates do not sum to population totals.

The estimated population size also differs across the studies. RAND matches population estimates published by the U.S. Census Bureau, which estimates that there will be 278 million nonelderly U.S. residents by 2020.[18]

RAND's estimated number without insurance is comparable to Urban's estimate (conditional on assumptions about CSR payment) and slightly lower than CBO's, both with and without the mandate. Compared to the other modelers, we estimate that slightly more people will be enrolled in employer coverage, and slightly fewer people will be insured in Medicaid. Estimates for individual market enrollment — the market that is arguably most affected by the elimination of the individual mandate penalty — are similar across the three models.

RAND estimates that age-specific silver premiums will change from –1 percent to 6.5 percent, and bronze premiums will increase from 3 percent to 13 percent, depending on assumptions about behavioral response to the mandate. CBO estimates that age-specific premiums will increase by around 10 percent per year. The Urban Institute estimates that the combination of policies expected to be in place during the 2019 open enrollment period — including elimination of the individual mandate penalty, CSR nonpayment, and reductions in funding for enrollment and

Exhibit A2. Comparison to Congressional Budget Office and Urban Institute

	COMPARE Base, 2020		COMPARE, CSRs paid, 2020		CBO, 2020		Urban, 2019	
	With IM	No IM	With IM	No IM	With IM and CSRs paid	No IM and CSRs paid	With IM and CSRs paid	No IM, CSRs not paid
Total ESI	157.3	155.1	157.7	155.3	154	153	149	148
Total nongroup	19.2	15.7	17.5	14.2	18	14	19	16*
Total Medicaid	61.5	60.5	61.4	60.4	68	66	69	69
Other (including Medicare)	12.5	12.5	12.5	12.5	13	13	9	9
Total uninsured	27.7	34.3	29.0	35.6	31	38	28	33
Total population	278	278	274	274	274	274	274	274
Percent uninsured	10.0%	12.3%	10.6%	13.0%	11.3%	13.9%	10.2%	11.9%

Data: Estimates for CBO come from their November 2017 report on eliminating the individual mandate; see Congressional Budget Office, *Repealing the Individual Health Insurance Mandate: An Updated Estimate* (CBO, Nov. 8, 2017), https://www.cbo.gov/publication/53300. While CBO has revised its estimates since then, the revised estimates do not isolate the effect of eliminating the individual mandate; see Congressional Budget Office, *Federal Subsidies for Health Insurance Coverage for People Under Age 65: 2018 to 2028* (CBO, May 2018), https://www.cbo.gov/system/files/115th-congress-2017-2018/reports/53826-healthinsurancecoverage.pdf. Estimates for the Urban Institute come from Linda Blumberg, Matthew Buettgens, and Robin Wang, *The Potential Impact of Short-Term Limited-Duration Policies on Insurance Coverage, Premiums, and Federal Spending* (Urban Institute, Feb. 2018), https://edit.urban.org/sites/default/files/publication/96781/2001727_0.pdf.

Notes: CBO allows multiple sources of coverage, so estimates do not sum to population totals. ESI = employer-sponsored insurance.

* Includes 4 million people enrolled in short-term plans that do not meet minimum essential coverage requirements.

outreach — will increase average premiums by 18.2 percent relative to the combination of policies in place in late 2016. These estimates are higher than RAND's because they reflect several policy changes in addition to the removal of the mandate penalty. Further, the Urban Institute reports changes in average premiums, which are not directly comparable to changes in age-specific premiums.

CBO estimates that removing the mandate penalty will reduce the federal deficit. Our analysis demonstrates that the effects of removing the mandate penalty on the federal deficit are uncertain, and depend on assumptions. However, in six of the 10 scenarios, RAND's model predicts that eliminating the individual mandate penalty will increase the federal deficit. These findings are strongly influenced by assumptions about whether the welcome-mat effect remains in place after the mandate penalty is eliminated. The Urban Institute estimates that the combination of policies it analyzed, including removing the individual mandate penalty, will increase federal spending by 9.3 percent.

Additional Sensitivity Analyses and Results

For each of the changes reported in the main text, there are two underlying scenarios used to generate that estimate — one with and one without the individual mandate. Most of the parameters analyzed in the report, such as the taste for compliance, are only relevant in scenarios that include the individual mandate. However, scenarios that involve the welcome-mat effect dissipating and inertia in decision-making can affect results without the individual mandate. Further, some scenarios assume the federal government pays for cost-sharing reductions, and others assume costs are loaded onto silver plans. Exhibit A3 summarizes the 20 scenarios underlying each of the 10 pairwise comparisons shown in the main text.

Exhibits A4, A5, and A6 present the full results from all analyses, including total insured in each scenario, bronze and silver premiums in each scenario, and the total effects on the federal deficit.

Exhibit A3. Pairwise Combinations of Scenarios Modeled

Scenario	Results with mandate	Results without mandate
1. Base	Equation 1, R_{ij}=0.80*$penalty_i$	Equation 1, with no individual mandate penalty
2. Taste for compliance	Equation 1, R_{ij}=$886	Equation 1, with no individual mandate penalty
3. Age-based taste for compliance	Equation 1, R_{ij}=(0.80*$penalty_j$)+38.52*[max(age_i,18)-18]	Equation 1, with no individual mandate penalty
4. Unaware of exemptions	Equation 1, R_{ij}=(1-0.20)*(0.80*$penalty_j$)	Equation 1, with no individual mandate penalty
5. Low probability of paying penalty	Equation 1, R_{ij}=0.50*$penalty_i$	Equation 1, with no individual mandate penalty
6. Inertia in decision-making	Equation 1, R_{ij}=0.80*$penalty_i$	Equation 1 with no individual mandate penalty, but we increase $U(H_{ij})$ by 2/3rds for whatever insurance choice the individual took with the mandate in place.
7. Welcome-mat effect tied to mandate	Equation 1, R_{ij}=0.80*$penalty_i$	Equation 1, no individual mandate penalty, no welcome-mat effect (we decrease $calibration_{Medicaid,K}$ by $200)
8. CSRs paid	Equation 1, R_{ij}=0.80*$penalty_i$, CSRs paid by federal government	Equation 1, CSRs paid by federal government, no individual mandate penalty
9. Combined scenario A	Equation 1, R_{ij}=0.80*{(0.50*$penalty_i$)+[38.52*(max(18,age_i)-18)]}	Equation 1, no individual mandate penalty, no welcome-mat effect (we decrease $calibration_{Medicaid,K}$ by $200)
10. Combined scenario B	Equation 1, R_{ij}=0.80*[(0.50*$penalty_i$)+$886]	Equation 1 with no individual mandate penalty, but we increase $U(H_{ij})$ by 2/3rds for whatever insurance choice the individual took with the mandate in place

Exhibit A4. Enrollment by Source of Coverage (in millions), 2020, Alternative Assumptions About Individual Mandate (IM) Response

	Base		Taste for compli-ance	Age-based taste for compli-ance	Unaware of exemp-tions	Low proba-bility of paying penalty	Inertia in decision-making	Welcome-mat effect dissipates	CSRs paid		Combined scenario A	Combined scenario B	
	With IM	No IM	With IM*	With IM*	With IM*	With IM*	No IM**	No IM**	With IM	No IM	With IM***	With IM	No IM
Total ESI	157.3	155.1	158.1	157.3	157.4	156.6	156.1	156.2	157.7	155.3	157.0	157.9	156.9
Total nongroup	19.2	15.7	18.9	22.1	18.9	17.5	17.7	15.9	17.5	14.2	20.5	19.5	17.9
Total Medicaid	61.5	60.5	61.7	61.8	62.3	61.3	61.3	54.1	61.4	60.4	61.7	61.7	59.6
Other	12.5	12.5	12.5	12.5	12.5	12.5	12.5	12.5	12.5	12.5	12.5	12.5	12.5
Total uninsured	27.7	34.3	26.9	24.4	27.0	30.1	30.5	39.3	29.0	35.6	26.4	26.5	31.2

Data: RAND COMPARE microsimulation model.

Note: ESI = employer-sponsored insurance.

* These scenarios, which include the individual mandate penalty, are compared to the "Base no IM" scenario to estimate the effects of removing the mandate penalty.

** These scenarios, which assume the individual mandate penalty is eliminated, are compared to the "Base with IM" results to estimate the effect of eliminating the mandate penalty.

*** This scenario, which assumes the individual mandate penalty is in place, is compared to the "Welcome-mat effect dissipates" results to estimate the effect of eliminating the penalty.

Exhibit A5. ACA-Compliant Individual Market Premiums (in dollars) for a 40-Year-Old Nonsmoker, 2020, Alternative Assumptions About Individual Mandate (IM) Response

	Base		Taste for compli-ance	Age-based taste for compli-ance	Unaware of exemp-tions	Low proba-bility of paying penalty	Inertia in decision-making	Welcome-mat effect dissipates	CSRs paid		Combined scenario A	Combined scenario B	
	With IM	No IM	With IM*	With IM*	With IM*	With IM*	No IM**	No IM**	With IM	No IM	With IM***	With IM	No IM
Bronze	4,655	4,986	4,682	4,408	4,711	4,837	4,814	4,908	4,968	5,292	4,541	4,655	4,792
Silver	7,283	7,382	7,327	7,004	7,072	7,219	7,212	7,288	5,796	6,174	7,164	7,241	7,193

Data: RAND COMPARE microsimulation model.

* These scenarios, which include the individual mandate penalty, are compared to the "Base no IM" scenario to estimate the effects of removing the mandate penalty.

** These scenarios, which assume the individual mandate penalty is removed, are compared to the "Base with IM" results to estimate the effect of removing the mandate penalty.

*** This scenario, which assumes the individual mandate penalty is in place, is compared to the "Welcome-mat effect dissipates" results to estimate the effect of eliminating the individual mandate penalty.

Exhibit A6. Effects on Federal Deficit (in $ billions), 2020, Alternative Assumptions About Individual Mandate (IM) Response

	Base		Taste for compliance	Age-based taste for compliance	Unaware of exemptions	Low probability of paying penalty	Inertia in decision-making	Welcome-mat effect dissipates	CSRs paid		Combined scenario A	Combined scenario B	
	With IM	No IM	With IM*	With IM*	With IM*	With IM*	No IM**	No IM**	With IM	No IM	With IM***	With IM	No IM
Spending													
Medicaid and CHIP spending	301.1	300.7	300.9	301.1	302.1	301.4	299.6	291.9	301.0	300.8	301.2	300.6	297.8
Premium subsidies	80.8	80.7	81.5	78.7	77.8	78.9	80.2	79.2	58.7	61.2	80.6	80.9	79.6
Cost-sharing subsidies	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	3.9	3.6	0.0	0.0	0.0
Total spending	381.9	381.4	382.4	384.1	380.0	380.3	379.8	371.1	363.6	365.6	381.8	381.5	377.4
Revenue													
Individual mandate	5.8	0.0	5.5	4.3	6.9	4.3	0.0	0.0	6.5	0.0	4.2	4.3	0.0
Employer mandate	14.4	14.4	14.4	14.4	14.4	14.4	14.5	14.4	14.4	14.4	14.4	14.4	14.4
Tax on high-cost health plans	1.7	1.7	1.7	1.7	1.8	1.7	1.5	1.7	1.7	1.7	1.9	1.8	1.5
Tax revenue relative to base scenario (with IM)	0.0	4.6	–1.9	–0.1	–0.4	1.4	2.5	2.2	–0.9	4.1	0.6	–1.4	0.8
Total revenue	21.9	20.7	19.7	20.3	22.8	21.8	18.5	18.3	21.7	20.1	21.0	19.1	16.8
Net total	360.0	360.7	362.7	359.4	357.2	358.6	361.3	352.8	341.9	345.4	360.8	362.5	360.6

Data: RAND COMPARE microsimulation model.

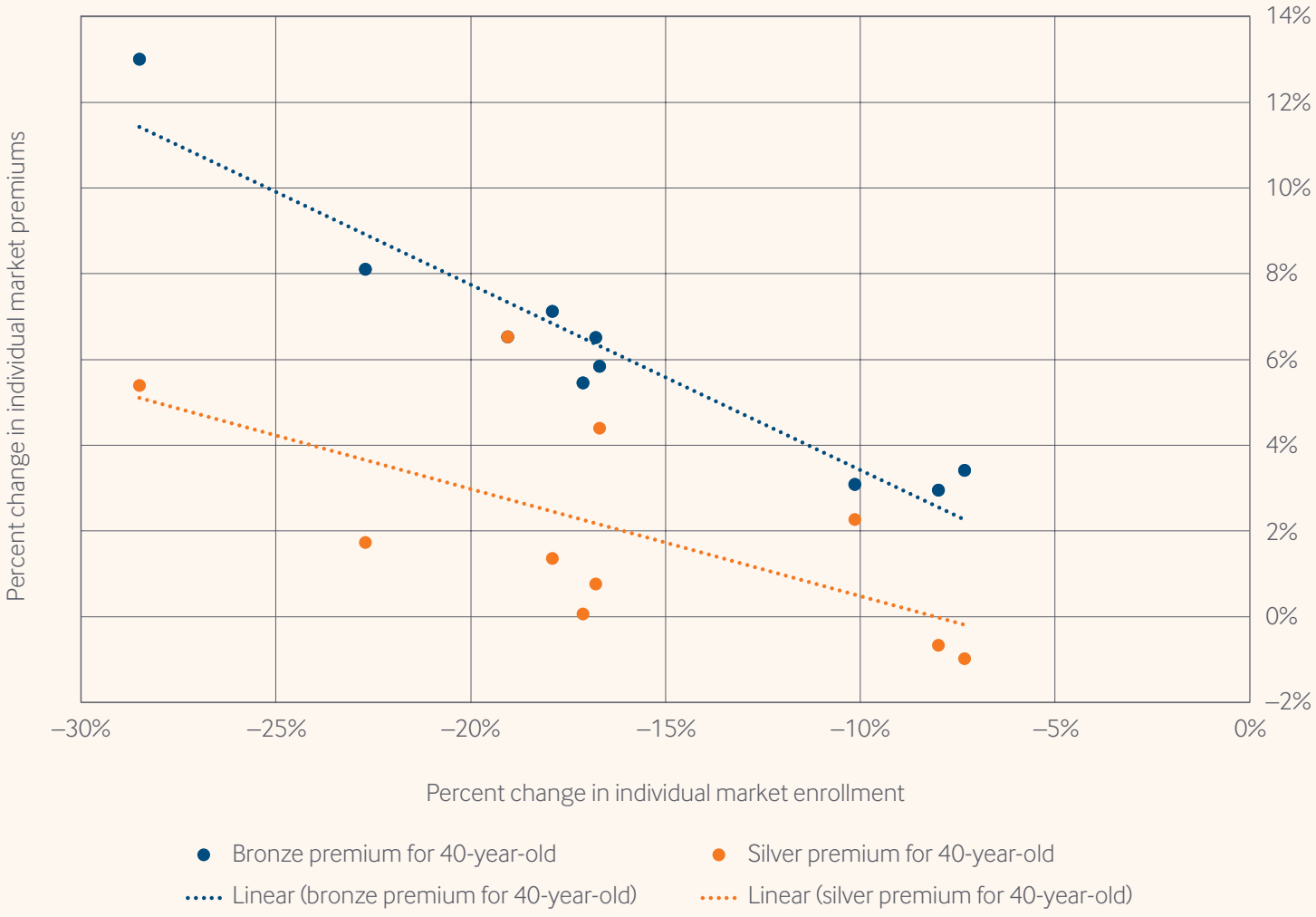
* These scenarios, which include the individual mandate penalty, are compared to the "Base no IM" scenario to estimate the effects of removing the mandate penalty.

** These scenarios, which assume the individual mandate penalty is removed, are compared to the "Base with IM" results to estimate the effect of removing the mandate penalty.

*** This scenario, which assumes the individual mandate penalty is in place, is compared to the "Welcome-mat effect dissipates" results to estimate the effect of eliminating the individual mandate penalty.

Exhibit A7 shows the relationship between premium changes and enrollment changes in the individual market, for each of the 10 scenarios analyzed, relative to the scenario in which the mandate is enforced. The horizontal access shows changes in individual market enrollment, and the vertical access shows changes in individual market premiums. We plot changes in bronze premiums in blue, and changes in silver premiums in orange. The dots represent the actual changes that we estimated in our analyses, and the lines represent a regression-based linear fit of the relationship between enrollment and premiums. The analysis confirms that premium increases are larger in scenarios where a larger proportion of individual market enrollees drop coverage in response to the removal of the mandate penalty.

Exhibit A7. Individual Market Premium Changes vs. Changes in Nongroup Enrollment



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