Project Report

Section 1332 Waiver Evaluation Report

Evaluating the Minnesota Reinsurance Program

Prepared for: Centers for Medicare & Medicaid Services and Office of the Assistant Secretary for Planning and Evaluation

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Foreword

Section 1332 of the Patient Protection and Affordable Care Act (ACA) permits states to apply for waivers of certain ACA requirements to pursue innovative and individualized state strategies that provide their residents with access to affordable, quality health care, subject to approval by the Department of Health and Human Services and the Department of the Treasury (collectively, the Departments). In order for a section 1332 waiver to be approved, the Departments must determine that the waiver complies with section 1332 statutory guardrails. That is, the waiver must provide coverage that is at least as comprehensive as the coverage provided without the waiver (comprehensiveness guardrail); provide coverage and cost-sharing protections against excessive out-of-pocket spending that are at least as affordable as without the waiver (affordability guardrail); provide coverage to at least a comparable number of residents as without the waiver (coverage guardrail); and not increase the federal deficit (deficit neutrality guardrail).

As of Plan Year 2021, the Departments have approved 16 states' waivers. Among these states, 14 currently operate state-based reinsurance programs by waiving the single risk pool requirement under section 1312(c)(1) of the ACA to the extent that it would otherwise require excluding total expected state reinsurance payments when establishing the market-wide index rate.[1,2]

Generally, states with approved section 1332 state-based reinsurance waivers aim to accomplish one or more of the following policy goals: reduce individual Marketplace premiums; increase enrollment in the individual market; maintain issuer participation; and/or attract more issuers to the Marketplace or encourage issuers to expand service areas. States may then apply federal pass-through amounts (generated by the waiver's premium tax credit savings) to sustainably fund the state-based reinsurance waiver program alongside state funding.

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[1] State-based reinsurance programs are distinct from the temporary federal reinsurance program that was effective for the 2014 through 2016 benefit years, the latter having been established via section 1341 of the ACA. The goal of the ACA's temporary reinsurance program was to stabilize individual market premiums during the early years of the federal market reforms that took effect beginning in 2014.

[2] The remaining two states are Hawaii, which is implementing an approved section 1332 waiver that waives the ACA requirement that a Small Business Health Options Program (SHOP) operate in Hawaii and other related requirements relevant to SHOP Exchanges, and Georgia, which will begin implementing the first part of its approved section 1332 waiver, a state-based reinsurance program, in 2022.

The Departments are responsible for oversight of approved section 1332 waivers and monitoring of compliance with the section 1332 guardrails and the specific terms and conditions (STCs) of the state's approved waiver. Pursuant to section 1332(a)(4)(B)(v) of the ACA, 31 CFR §33.120(f) and 45 CFR §155.1320(f), and the STCs of the state's approved waiver, if requested by the Departments, the state must fully cooperate with the Departments or an independent evaluator selected by the Departments to undertake an independent evaluation of any component of the waiver. As such, the Centers for Medicare & Medicaid Services Center for Consumer Information and Insurance Oversight undertook this evaluation to support the aforementioned responsibilities.

As more states continue to express interest in applying for state-based reinsurance waivers or extending currently approved state-based reinsurance waivers, the Departments seek to better understand the strengths and weaknesses of reinsurance programs, and how to improve program effectiveness. Additionally, as the section 1332 waiver program continues to grow in terms of dollar amounts—to date, the Departments have distributed more than $4 billion in pass-through funding to states—the Departments aim to ensure that these reinsurance programs are fiscally responsible while achieving policy goals and to

1. determine if the approved state-based reinsurance waiver programs are working as intended, and to identify factors contributing to the observed outcomes
2. improve planning and implementation of approved state-based reinsurance waiver programs, in line with the ACA and section 1332 guardrails
3. collect empirical evidence and conduct rigorous analysis that will inform innovative, data-driven public policy for future waiver years.

As this is the Departments' first set of federal evaluations on section 1332 waivers, our analyses present a different and novel approach from past analyses of section 1332 waivers (e.g., actuarial analyses conducted as part of states' waiver applications). We examined one question relating to the affordability guardrail to look at the impact on enrollees' premium spending (i.e., premiums net of subsidies) for representative individuals for different metal level plans. We also examined one research question relating to the coverage guardrail to look at the impact on enrollment by federal poverty level brackets and among unsubsidized individuals.

Although results differed across the three states evaluated (Alaska, Minnesota, and Oregon), the analyses found some statistically significant effects. Specifically, in Alaska and Minnesota, approved section 1332 state-based reinsurance waivers are associated with premiums that are lower than would be expected without the waiver in place. Given the methodological limitations noted in the report—including limited available data and the small number of comparison states for purposes of the analysis—the findings should be interpreted with caution. The lack of statistical significance for some of the findings does not automatically reflect on these

reinsurance programs' effectiveness; rather, the findings represent opportunities for future research particularly with respect to these reinsurance programs' potentially differential impacts on enrollee subgroups. Opportunities for future research are detailed in the report's discussion.

The Departments remain committed to advancing health insurance coverage and working with states on section 1332 waivers that promote the objectives of the January 28, 2021, Executive Order on Strengthening Medicaid and the Affordable Care Act (EO 14009),[3] and the January 20, 2021, Executive Order on Advancing Racial Equity and Support for Underserved Communities Through the Federal Government (EO 13985).[4]

Center for Consumer Information and Insurance Oversight
September 2021

[3] "Strengthening Medicaid and the Affordable Care Act," February 2, 2021.

[4] "Advancing Racial Equity and Support," January 25, 2021.

About This Report

The Centers for Medicare & Medicaid Services (CMS) Center for Consumer Information and Insurance Oversight (CCIIO) contracted with the RAND Corporation to conduct evaluations of approved section 1332 waivers first implemented by three states starting in 2018: Alaska, Minnesota, and Oregon. This report documents findings from the evaluation of Minnesota's waiver, through which the state implemented the Minnesota Premium Security Plan. Minnesota's reinsurance program enables issuers participating in the individual health insurance market to share costs with the state for an individual's claims exceeding a certain threshold, known as an "attachment point," up to a cap, and is designed to stabilize premiums and encourage enrollment in individual market plans. Under the contract, RAND provided technical assistance with program evaluation design, methodology, analysis, and writing for evaluations of states' section 1332 waivers. Specifically, this evaluation examined changes in enrollee premium spending and enrollment in Minnesota's individual health insurance market in the three years following approval of the waiver. This research was funded by the Office of the Assistant Secretary for Planning and Evaluation (ASPE) and the Centers for Medicare & Medicaid Services (CMS), Center for Consumer Information and Insurance Oversight (CCIIO) within the U.S. Department of Health and Human Services, and this report was prepared on behalf of CMS as part of an ASPE Policy and Technical Assistance Contract (Contract No. HHSP233201500038I) and carried out within the Payment, Cost, and Coverage Program in RAND Health Care. The contents of this paper are solely the responsibility of the authors and do not necessarily represent the official views of the U.S. Department of Health and Human Services or any of its agencies.

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Summary

Background

Section 1332 of the Patient Protection and Affordable Care Act (ACA) permits states to apply for section 1332 waivers for State Innovation (or "section 1332 waiver") to pursue innovative strategies that provide their residents with access to high-quality, affordable health insurance. These changes must meet certain conditions, known as "guardrails," relating to the number of covered residents, the comprehensiveness and affordability of coverage, and deficit-neutrality to the federal government. Most section 1332 waivers have been used by states to implement reinsurance programs for their individual health insurance market that are designed to reduce premiums, encourage enrollment, and maintain or increase insurer participation. To date, 14 states have implemented state-based reinsurance programs for their individual markets under approved section 1332 waivers.

Beginning in 2018, Minnesota used its section 1332 waiver to implement the Minnesota Premium Security Plan, a reinsurance model that reimburses insurers for a portion of claims that exceed a threshold (an "attachment point") up to a cap. The reinsurance program is funded through a combination of federal pass-through funding for premium tax credits that would have been paid by the federal government to consumers absent the waiver, as well as funding contributed by the state. The Centers for Medicare & Medicaid Services Center for Consumer Information and Insurance Oversight (CCIIO) contracted with the RAND Corporation to conduct an evaluation of the waiver on individual market premiums and enrollment in Minnesota. The evaluation addressed two research questions:

- What is the waiver's impact on enrollee premium spending by representative individuals (by age and income) on each of the following on-marketplace plans?

  lowest cost bronze (LCB)
  lowest cost silver (LCS)
  second lowest cost silver (SLCS)
  lowest cost gold (LCG)?

- What is the waiver's impact on individual market enrollment by income and for unsubsidized individuals?

Methodology

To address these questions, we used a difference-in-differences methodology to compare changes in premiums and enrollment in Minnesota between the pre-waiver period (2015–2017) and each of three post-waiver years (2018, 2019, and 2020), relative to the corresponding change in a "synthetic comparison group" comprising multiple states that did not implement a section

1332 waiver. The research questions, outcomes, and data sources for the evaluation are displayed in Table S.1. The states in the synthetic comparison group were differentially weighted for each analysis so that the comparison group matched Minnesota's pre-waiver trends in each outcome. The pre-waiver data available for the analysis varied from one to three years across the analyses. A key limitation of the methodology is that it does not directly account for state-specific market conditions and other time-varying differences between states. The evaluation examines years prior to the American Rescue Plan of 2021 and does not take into account the potential impact of the American Rescue Plan on section 1332 waivers.

Table S.1. Evaluation Research Questions, Outcomes, and Data Sources

Research Question	Outcome	Stratification	Data Source
Q1. What is the waiver's impact on enrollee premium spending by representative individuals (by age and income) on each of the following on-marketplace plans? LCB LCS SLCS LCG	Enrollee premium spending	Within each of the four plans: Age 27 –250%, 350%, 450% of FPL Age 45 –250%, 350%, 450% of FPL Age 64 –250%, 350%, 450% of FPL	RWJF HIX Compare
Q2. What is the waiver's impact on individual market enrollment by income and for unsubsidized individuals?	Per capita enrollment	200–250% of FPL 251–350% of FPL 351–400% of FPL	CCIIO OEP PUFs and data provided directly by selected state-based exchanges
		Unsubsidized	CCIIO marketplace effectuated enrollment data; CCIIO EDGE risk adjustment data

NOTES: FPL = federal poverty level; CCIIO = Center for Consumer Information and Insurance Oversight; OEP PUFs = Open Enrollment Period Public Use Files; RWJF HIX = Robert Wood Johnson Foundation HIX. Enrollee premium spending is defined as the premium minus subsidies. Per capita enrollment in each stratification is calculated as individual market enrollment in the stratification divided by the state population.

Key Findings

- The statewide average premium for the SLCS plan offered in the Minnesota marketplace after the waiver was estimated to be 36 percent lower than it would have been in the absence of the waiver, and average premiums were 22 percent lower for the LCB plan, 34 percent lower for the LCS plan, and 31 percent lower for the LCG plan. These estimates exceed those derived from premiums with and without the waiver reported by carriers to the state and indicate that multiple factors may have contributed to lower premiums apart from the reinsurance program.
- Unsubsidized enrollees are estimated to have realized significant savings in premium spending across all plan types.

- Among individuals who are eligible for subsidies, we estimate that enrollee premium spending may have increased for enrollees who selected the LCB plan. For these enrollees, the reduction in their subsidy decreased more than the reduction in their plan premium. We found no statistically significant changes in enrollee premium spending for subsidy-eligible individuals who enrolled in the three other plans we examined.
- For unsubsidized individuals, Minnesota's waiver was associated with an estimated 66,000 additional enrollees on average than if the waiver had not been implemented—a large effect when compared with total unsubsidized enrollment in Minnesota in the year before the waiver (nearly 92,500). This effect was driven by (1) the post-waiver stabilization of enrollment trends in Minnesota relative to the pre-waiver period (rather than an increase in enrollment) and (2) a continuation of enrollment declines among the comparison group.
- For individuals who are eligible for the ACA's marketplace subsidies, we found no impact of the waiver on enrollment across any of the three income categories we examined.

Conclusion

Premium growth in Minnesota exceeded the national average prior to the implementation of the waiver, and enrollment among unsubsidized individuals had dropped precipitously. Minnesota's waiver was associated with lower premiums across all plans offered in the marketplace. This result appears to have stabilized enrollment trends among unsubsidized individuals more rapidly than would have occurred in the absence of the waiver. At the same time, enrollee premium spending may have increased for enrollees in the LCB plan whose subsidies were reduced as a result of the waiver. We are unable to conclude definitively whether subsidy-eligible enrollees experienced increases or decreases in enrollment because of the waiver.

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Abbreviations

ACA	Affordable Care Act
APTC	advance premium tax credit
BHP	Basic Health Program
CCIIO	Center for Consumer Information and Insurance Oversight
CMS	Centers for Medicare & Medicare Services
CSR	cost-sharing reduction
EDGE	External Data Gathering Environment
FPL	federal poverty level
IRS	Internal Revenue Service
KFF	Kaiser Family Foundation
LCB	lowest cost bronze
LCG	lowest cost gold
LCS	lowest cost silver
MPSP	Minnesota Premium Security Plan
OEP	Open Enrollment Period
OEP PUFs	Open Enrollment Period Public Use Files
PUF	Public Use File
RWJF	Robert Wood Johnson Foundation
RWJF HIX Compare	Robert Wood Johnson Foundation HIX Compare data
SLCS	second lowest cost silver

1. Introduction

Background

Section 1332 of the Patient Protection and Affordable Care Act (ACA) permits states to apply for a State Innovation Waiver (or "section 1332 waiver") to pursue innovative strategies that provide residents with access to high-quality, affordable health insurance while retaining the basic protections of the ACA. Section 1332 allows states to waive particular provisions of the ACA, including those related to metal tiers, essential health benefits, premium tax credits, cost-sharing reductions (CSRs), and use of a single risk pool. States that are granted waivers must comply with statutory guardrails that ensure consumers retain access to quality health care. The care must be at least as comprehensive and affordable as would be provided absent the waiver; the waiver must provide coverage to a comparable number of state residents as would be provided absent the waiver; and the waiver must be deficit neutral to the federal government. The Centers for Medicare & Medicaid Services (CMS) and the Department of the Treasury jointly oversee the waiver program.

Most section 1332 waivers have been used by states to implement reinsurance programs (Wright et al., 2019). Reinsurance reduces risk for insurers by reimbursing insurers for a share of enrollee claims that are typically high-cost claims (Bovbjerg, 1992). Prior research has found that reinsurance can achieve risk reduction as well as limiting incentives for adverse selection of higher-cost enrollees (Layton, McGuire, and Sinaiko, 2016; Zhu et al., 2013). Along with risk adjustment and risk corridors, the ACA implemented a federal reinsurance program from 2014 to 2016 to promote insurer competition and stabilize the individual market (Cox et al., 2016). States may pursue reinsurance programs in order to reduce premiums, maintain or increase insurer participation, stabilize markets, and leverage federal matching funds through a section 1332 waiver (Manatt Health, 2019). The impact of reinsurance could vary highly across states depending on enrollee spending and program parameters in a given state (Drake, Fried, and Blewett, 2019; Polyakova, Bhatia, and Bundorf, 2021).

Fourteen states are currently operating state-based reinsurance programs for their individual market under approved section 1332 waivers (CMS, undated; Kaiser Family Foundation [KFF], 2020). Depending on the state, issuers are reimbursed by the state for (1) a portion of the costs for enrollees whose claims exceed a threshold, known as an "attachment point," up to a cap; (2) all claim costs for enrollees with certain health conditions; or (3) a hybrid of the two approaches. Similar to the federal reinsurance program that operated between 2014 and 2016, the state-run programs in these 14 states are designed to stabilize premiums and encourage enrollment in the individual market. The reinsurance program in each state is funded through a combination of federal pass-through funding for premium tax credits that would have been paid by the federal

government to consumers absent the waiver, as well as funding contributed by the state; for example, through state health insurance taxes (Keith, 2020).

CMS Center for Consumer Information and Insurance Oversight (CCIIO) contracted with the RAND Corporation to design and conduct evaluations of the reinsurance programs for three states whose waivers began in 2018 (Alaska, Minnesota, and Oregon). To our knowledge, these are the first independent evaluations of reinsurance programs implemented under section 1332 authority. This report describes our methodology and the results from our evaluation of Minnesota's waiver program. For the evaluation of Alaska's waiver program, see Rao et al. (2021), and for the evaluation of Oregon's waiver program, see Liu et al. (2021).

Minnesota's Reinsurance Program

The reinsurance program implemented through Minnesota's section 1332 waiver, the Minnesota Premium Security Plan (MPSP), uses a claims-based reinsurance model that reimburses insurers for a portion of claims that exceed a certain threshold, up to a cap. The model parameters used in the MPSP were the same in each of the first three years of the program and included a $50,000 attachment point, 80-percent coinsurance rate, and a cap of $250,000 in claims costs (CCIIO, 2021). The total actual cost of the reinsurance program, measured in reinsurance reimbursements, was $136.1 million in 2018 and $149.7 million in 2019, and the planned costs for 2020 and 2021 were $165.8 million and $204.5 million, respectively. Financing for the state's share of the reinsurance program comes from the state's general fund and from a fund created to increase access to health care, contain health care costs, and improve the quality of health care services for Minnesotans. One of several revenue sources for the health care access fund comes from a portion of past accumulations of the state's 1.8-percent provider tax, which applies to hospitals and other providers (Minnesota Department of Management and Budget, 2021). Based on the actual and planned costs of the reinsurance program, Minnesota estimates that individual market premiums were reduced by 16.8 percent, on average, in 2018, 20.2 percent in 2019, 21.3 percent in 2020, and 21.3 percent in 2021, compared with a hypothetical scenario in which there had been no waiver (CCIIO, 2021).

Previous research on premium trends in Minnesota's individual market indicates that the average benchmark premium grew by over 126.4 percent between 2014 and 2017 as compared with 31.5 percent growth for the United States overall (KFF, 2021). Average rate increases ranged from 14 to 49 percent across carriers participating in the individual market in 2016 (Minnesota Department of Commerce, 2015) and from 50 to 67 percent in 2017 (Minnesota Department of Commerce, 2016). State officials also reported significant instability in the market, including the exit of an insurer representing 39 percent of the state's individual market in 2017 and multiple issuers restricting their service area in the state—particularly in rural areas. Insurers in the state advocated strongly for a reinsurance program, noting that its implementation would help them to remain in the market.

Over the first three years after implementation of the state's reinsurance program, benchmark premiums decreased by 25.5 percent in Minnesota as compared with an *increase* of 25.9 percent for the United States overall. At the same time, enrollment changed little (0.1% increase) in Minnesota between 2017 and 2020 as compared with a national decline of 6.6 percent. These trends suggest that Minnesota's waiver might have lowered premiums and stabilized enrollment in the individual market. However, these analyses are based on comparisons to the overall United States—rather than a comparison group of states whose insurance markets are most similar to those of Minnesota.

Evaluation Questions and Hypotheses

Reinsurance programs can reduce health insurance premiums through several mechanisms. First, reinsurance reduces the risk to insurers of enrolling individuals who incur unexpectedly high claims costs. By reducing this risk, insurers can lower the "risk premium"—a factor built into the total premium calculation to ensure that health plans collect enough revenue to cover unanticipated claims.

Second, because the reinsurance program pays for a portion of high-cost claims, insurers may be able to reduce premiums because they no longer bear the full cost of enrollees' care. The ability to reduce costs in this manner depends on the source of financing for the reinsurance program. If reinsurance is funded solely through a tax levied on health plans participating in the reinsurance program, then the savings due to reduced claims costs may be offset, on average, by the cost of the tax (Dow, Fulton, and Baicker, 2010). However, Minnesota's reinsurance program is funded through a variety of sources beyond the individual health insurance market. As a result, the program reduces the total claims costs borne by individual market insurers, potentially lowering premiums. Premiums may fall even further if reinsurance results in a "virtuous cycle" in which healthy people with low average medical spending enroll as premiums fall. The addition of these less-expensive enrollees into the market may, in turn, further reduce premiums.

In general, we would expect that lower premiums would lead to increased enrollment in the individual market. However, for enrollees who receive advance premium tax credits (APTCs), the effects of reinsurance are not straightforward, because changes in enrollee premium spending (i.e., premiums net of APTCs) will depend on how the APTC changes relative to premiums. An individual's APTC is calculated as the difference between the cost of a benchmark plan, defined as the second lowest cost silver (SLCS) plan available in the marketplace, and a required contribution that varies with income.[5] During the period covered by our analysis, individuals were eligible for APTCs if they had incomes between 100 and 400 percent of the federal poverty

[5] The contribution is equal to the individual's income multiplied by an applicable percentage contribution that increases with income. If the applicable contribution exceeds the benchmark premium, the individual does not receive an APTC.

level (FPL) and no affordable offer of insurance from another source, such as an employer or Medicaid.

Because APTCs cap the amount that an individual pays for a benchmark plan as a percentage of income, APTC-eligible individuals who enroll in the benchmark plan will not experience changes in enrollee premium spending, unless the benchmark premium falls below the enrollee's required contribution. However, enrollees may apply their APTCs to plans with higher or lower premiums than the benchmark plan. If the benchmark premium falls due to reinsurance, APTC amounts will also fall since they are tied to the benchmark premium. Depending on the change in the APTC relative to the premium change in the selected plan, enrollee premium spending could increase, decrease, or remain unchanged. If premiums fall proportionately (i.e., by the same percentage) across all plans, the dollar value of the reduction in the APTC would exceed the dollar value of the reduction in premiums for lower-cost plans. Such an effect could reduce the likelihood that an enrollee is eligible for a $0 premium bronze plan, potentially reducing enrollment among low-income, subsidized individuals. However, it is not clear whether reinsurance-related premium changes would be proportional across plans and metal tiers, and the effect may be complicated by issuer entry/exit and changes in plan design. Because of the complexity surrounding the change in enrollee premiums for the subsidized population, we do not have a strong hypothesis about how reinsurance will affect enrollment and enrollee premium spending for people who are eligible for APTCs.

For unsubsidized individuals, the effect of reinsurance is more straightforward—we expect that reinsurance will lower premiums and hence increase enrollment. Unsubsidized individuals may include people with incomes above 400 percent of FPL, people with incomes below 400 percent of FPL who have access to affordable employer-sponsored insurance, or people with incomes below 400 percent of FPL for whom the cost of the benchmark premium is below their required income contribution. We expect that people in this last category would tend to be younger and have relatively high incomes, because the benchmark premium is lower for younger people and the required contribution increases with income.

Our analyses consider two key questions related to the effect of state reinsurance programs on premiums and enrollment. These questions, along with hypotheses on the likely impact of the waiver on each outcome, are shown in Table 1.1.

Evaluation Question	Hypotheses
1. What is the waiver's impact on enrollee premium spending by representative individuals on each of the following on-marketplace plans?	
a) SLCS (benchmark)	If household income >400% of FPL, we expect enrollee premium spending to fall. If income is in the subsidy-eligible range, we expect enrollee premium spending to fall only if the individual's benchmark premium is below the required contribution. This is more likely for those on the high end of the subsidy-eligible range (e.g., household income at 350% of FPL) and those who are younger (e.g., <30 years).
b) Lowest cost silver (LCS)	Same as above but results for the subsidy-eligible population may vary depending on how the change in the LCS plan premium compares with the change in the APTC.
c) Lowest cost bronze (LCB)	Same as above but results for the subsidy-eligible population may vary depending on how the change in the LCB plan premium compares with the change in the APTC.
d) Lowest cost gold (LCG)	Same as above but results for the subsidy-eligible population may vary depending on how the change in the LCG plan premium compares with the change in the APTC.
2. What is the waiver's impact on individual market enrollment for the following types of enrollees?	
a) People with incomes ≥200 percent and ≤250 percent of FPL[a]	Unclear effect—APTC deflects the impact of premium changes for those who enroll in the benchmark plan. Those enrolled in other plans may face higher or lower costs depending on how the APTC changes relative to the premium of the chosen plan, which could affect enrollment.
b) People with incomes >250 percent and ≤350 percent of FPL	Unclear effect—APTC deflects the impact of premium changes for those who enroll in the benchmark plan. Those enrolled in other plans may face higher or lower costs depending on how the APTC changes relative to the premium of the chosen plan, which could affect enrollment.
c) People with incomes >350 percent and ≤400 percent of FPL	Possible increase in enrollment if some people in this income range pay full premiums. We would expect any effect to be more pronounced for younger enrollees.
d) All unsubsidized enrollees	Increase in enrollment due to lower premiums.

NOTE: Enrollee premium spending is defined as the premium minus the APTC.
[a] Minnesota has operated a Basic Health Program (BHP), known as MinnesotaCare, since 2015. As part of the program, individuals with incomes up to 200% FPL enroll in the state-administered program rather than the Minnesota marketplace (MNsure).

For Question 1, representative individuals are defined based on a combination of age (27, 45, 64) and household income (250%, 350%, or 450% of FPL). We make these stratifications because premium levels vary with age,[6] and APTC amounts vary with income. We further assume that the representative individuals considered in our analysis would not have affordable coverage through another source of insurance. For Question 2, we consider enrollment both on

[6] Under the ACA, individual market insurers may charge a 64-year-old three times as much a 21-year-old, unless state law requires a more compressed premium range.

and off the marketplace, as Minnesota's reinsurance program applies to all non-grandfathered and non-grandmothered[7] individual market plans.

[7] The ACA allowed certain plans that existed before the law was enacted on March 23, 2010, to maintain "grandfathered" status, which exempts them from certain ACA requirements, including risk adjustment. Plans that came into existence after the law was signed but before the marketplaces went online in 2014 were later granted "grandmothered" status exempting them from risk adjustment and other provisions via a regulatory change implemented by CMS (Cohen, 2013).

2. Methodology

We combined multiple data sources to address the two research questions. To measure trends in premiums, we used plan-rating area-level premium data for marketplace plans in distinct metal tiers that we aggregated to the state level. To measure trends in enrollment we used state-level data measuring either on-marketplace enrollment or combined on- and off-marketplace enrollment, depending on the analysis. We used a difference-in-differences approach to estimate the impact of the waiver on premiums and enrollment. In this chapter, we briefly describe our methodology; a more detailed description is included in Appendix A.

Data Sources

We used four primary data sources for the evaluation:

1. Robert Wood Johnson Foundation HIX (RWJF HIX) Compare data (2015–2020): plan-rating area-level premium data for individual market plans offered on-marketplace.
2. CCIIO Open Enrollment Period Public Use Files (OEP PUFs) (2015–2020): state-level enrollment in marketplace plans by FPL category.
3. CCIIO marketplace effectuated enrollment tables (2015–2020): state-level on-marketplace enrollment overall and by APTC subsidy status.
4. CCIIO External Data Gathering Environment (EDGE) risk adjustment summary data (2015–2020): state-level total individual market enrollment.

Outcome Measures

Enrollee premium spending. We study the impact of the waiver on both total premiums and enrollee premium spending for four marketplace plan types (LCB, LCS, SLCS, and LCG) in each rating area in a state. For each plan type, we estimate a population-weighted average premium across all rating areas in each state, and we examine premium effects by metal tier and age for each post-waiver year. Enrollee premium spending refers to a consumer's expected spending on premiums net of APTCs. Since these amounts are not directly observable in our data, we estimate them by calculating the amount of the subsidy for each representative individual (combinations of ages 27, 45, and 64, and incomes at 250%, 350%, and 450% of FPL) using information on each enrollee's required contribution (based on household income and the

applicable percentage[8]) by year. We then estimate enrollee premium spending as the difference between the premium for the plan of interest and the amount of the subsidy.

Enrollment. We define enrollment in different ways depending on the data source. Enrollment is defined in CCIIO's OEP PUFs as "the number of unique consumers who selected a medical plan [on the individual market], were automatically re-enrolled into a medical plan, or were placed into a suggested alternate medical plan (regardless of whether the consumer paid the premium)" as of the end of the OEP. Additionally, "the count includes only consumers with non-canceled QHPs [qualified health plans]." By contrast, CCIIO's marketplace effectuated enrollment tables and CCIIO's EDGE risk adjustment summary data contain information about average monthly effectuated enrollments—individuals who paid premiums in a given month. For analyses that examine the waiver's impact on enrollment for unsubsidized individuals, we use effectuated enrollments (Table 2.1), but for the analysis that examines the waiver's impact on enrollment by income category, we measure enrollment using plan selections since effectuated enrollment data are not available by income for all states.[9] Enrollees in each income category include those who receive subsidies and those who do not.

Table 2.1 summarizes the research questions and the data sources used to address each question.

[8] For each FPL category, we defined household income using poverty guidelines (Department of Health and Human Services, undated) and applicable percentage using Internal Revenue Service [IRS] guidance 26 CFR 601.105 (IRS, 2014a, 2014b, 2016, 2017, 2018, 2019).

[9] Using data on enrollment in marketplace plans in 2020, we estimate that state-level enrollment measured by plan selections was 10% higher, on average, than the corresponding measures of effectuated enrollment.

Table 2.1. Summary of Research Questions by Data Source

Research Question	Outcome	Stratification	Data Source
Q1. What is the waiver's impact on enrollee premium spending by representative individuals (by age and income) on each of the following on-marketplace plans: LCB LCS SLCS LCG?	Enrollee premium spending	Within each of the four plans: Age 27 –250%, 350%, 450% of FPL Age 45 –250%, 350%, 450% of FPL Age 64 –250%, 350%, 450% of FPL	RWJF HIX Compare
Q2. What is the waiver's impact on individual market enrollment by income and for unsubsidized individuals?	Per capita enrollment	200–250% of FPL 251–350% of FPL 351–400% of FPL	CCIIO OEP PUFs and data provided by selected state-based exchanges
		Unsubsidized	CCIIO marketplace effectuated enrollment data; CCIIO EDGE risk adjustment data

NOTE: Enrollee premium spending is defined as the premium minus the APTC. Per capita enrollment in each stratification for Research Question 2 is calculated as individual market enrollment in the stratification divided by the state population.

Analytic Approach

We use a difference-in-differences approach to estimate the impact of the waiver on enrollee premium spending and enrollment in individual market plans in Minnesota. This methodology compares trends in the outcomes of interest in Minnesota with those of a comparison group and estimates the impact of the waiver as any departure in trends following the implementation of the waiver. For this analysis we use a "synthetic comparison group" methodology to generate a weighted comparison group that includes multiple states that did not implement section 1332 waivers. Specifically, the comparison states are individually weighted so that the weighted trends in the outcomes match those of Minnesota during the pre-waiver period. The synthetic comparison group methodology is commonly used in policy analysis when the unit of observation is a single large unit, such as a state. The approach can mitigate potential bias arising from policy changes in comparison states during the post-reinsurance period that could affect trends in premiums and enrollment and can reduce the likelihood that any one state will bias estimates of the impact of the reinsurance program.

For Research Question 2, enrollment data for each of the three income categories were available in Minnesota for a single pre-waiver year. As a result, rather than matching on pre-waiver trends between Minnesota and the comparison group, we used a simpler approach for this

analysis in which we equally weighted all comparison states.[10] In addition, as indicated in Table 2.1, we examined trends in enrollment among a subgroup of unsubsidized enrollees but not among subsidized enrollees. We omitted the latter because the subsidized population in Minnesota excludes individuals under 200 percent FPL, who are eligible for Minnesota's BHP (MinnesotaCare) rather than Minnesota's marketplace, and, as a result, Minnesota residents in this subgroup differ substantially from those in all other states with the possible exception of New York, which is the only other state that operates a BHP. Finally, we could only identify a comparison group that matched Minnesota's pre-waiver enrollment trends for the unsubsidized population using two years of pre-waiver data (2016–2017) as compared with three years (2015–2017), and so we excluded 2015 enrollment data for Research Question 2 for the unsubsidized subgroup analysis only.

We conducted four sensitivity analyses to assess the robustness of our results:

- Research Question 1
  - **Sensitivity Analysis 1.1: Difference-in-differences analysis with state weight penalty.** We repeated the main analysis after imposing a penalty that forced the loading of weights on a broader set of states in the synthetic comparison group.
  - **Sensitivity Analysis 1.2: Triple-difference analysis with state weight penalty.** We used a triple-difference methodology that is designed to provide additional control of factors that may differ between Minnesota and the synthetic comparison group by comparing outcomes in each state's individual market with those in its small group market before comparing Minnesota's trends with those of comparison states (see Appendix A for more details). This analysis also used a penalty that forced the loading of weights on a broader set of states.
- Research Question 2
  - **Sensitivity Analysis 2.1: Difference-in-differences analysis with per capita enrollment specification.** For the unsubsidized subgroup only, we repeated the main analysis using per capita enrollment as the outcome instead of percentage changes in per capita enrollment. As in the main analysis, we included the penalty term to load weights on a broader set of comparison states.
  - **Sensitivity Analysis 2.2: Triple-difference analysis with state weight penalty.** For the unsubsidized subgroup only, we used a triple-difference

[10] The main advantage of the synthetic comparison group is to provide a better match to trends in the waiver state across *multiple* years of pre-waiver data. As we had a single year of pre-waiver data in Minnesota, we weighted all 19 states in the comparison group equally for the analysis of the waiver's impact on enrollment for individuals in different income categories.

methodology that included per capita enrollment as the outcome and used the state weight penalty.

Discussion with Minnesota Department of Commerce

We interviewed seven representatives from the Minnesota Department of Commerce, which operates Minnesota's marketplace in July 2021 to further understand the structure, objectives, and outcomes of the state's reinsurance program. We used a semistructured interview protocol that was developed in conjunction with CMS and shared with the state representatives in advance of the call.

3. Results

Trends in Premiums and Enrollment in Minnesota's Individual Market

Across the four plan types examined in the analysis, premiums rose sharply between 2015 and 2017, peaking at near $4,500 annually for the LCB plan and over $6,500 annually for the LCG plan. Between 2017 and 2020, premiums fell for all four plans, with the largest absolute reduction for the LCG plan (Figure 3.1).

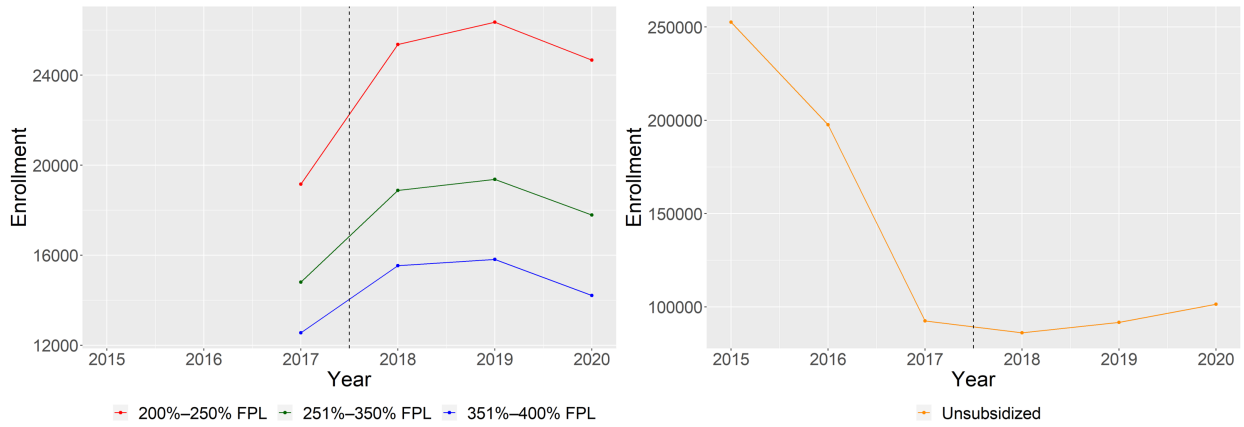
Figure 3.1. Individual Marketplace Plan Premiums in Minnesota, Age 45, by Plan, 2015–2020

SOURCE: Authors' analysis using RWJF HIX Compare.

Enrollment increased for each of the three income groups examined between 2017 and 2018 but increased most for individuals with incomes 200–250 percent of FPL (Figure 3.2, left panel). Enrollment was mostly stable between 2018 and 2019 and then decreased slightly between 2019 and 2020 for all three groups. Between 2015 and 2017 enrollment among unsubsidized individuals decreased by over 63 percent, stabilized during the first post-waiver year, and then

increased slightly over the next two years (Figure 3.2, right panel). We note that the left panel includes only a single year of pre-waiver data because data before 2017 were not available for the analysis.

Figure 3.2. Individual Market Enrollment in Minnesota, by Income Category and Among Unsubsidized Enrollees, 2015–2020

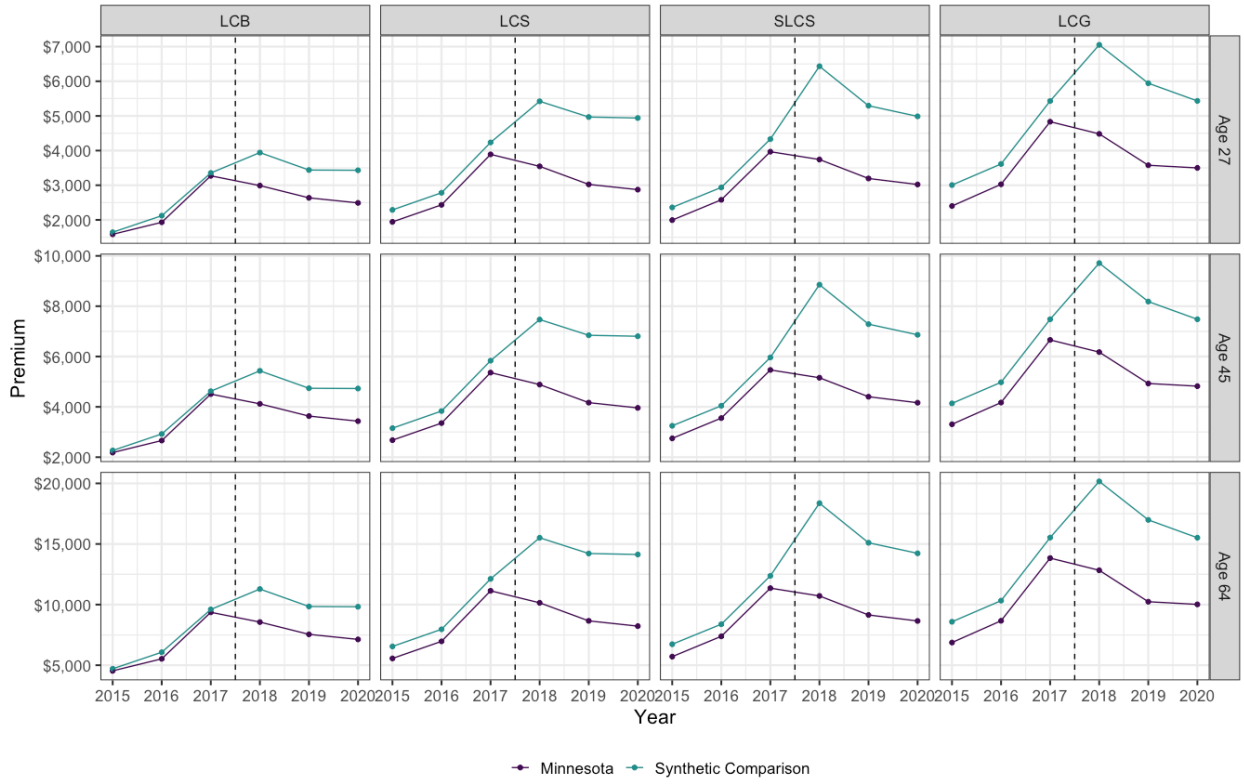


SOURCE: Authors' analysis using data provided by Minnesota marketplace officials (for enrollment by income category) and CCIIO marketplace effectuated enrollment tables and EDGE risk adjustment data (for unsubsidized enrollment).
NOTE: The left panel is limited to enrollment in marketplace plans while the right panel includes enrollment in both on and off-marketplace plans.

Waiver Impact on Enrollee Premium Spending

Average statewide individual market premiums for the four plan types increased in both Minnesota and the synthetic comparison group to a similar extent in the pre-waiver period (Figure 3.3). However, in the first post-waiver year, premiums in Minnesota decreased across all four plans while premiums continued to increase in the synthetic comparison group—particularly for the SLCS plan and LCG plan. After 2018, premiums decreased in both Minnesota and the synthetic comparison group for all four plans, especially for the SLCS and LCG plans in the comparison group. The relative weights for the 24 comparison states are provided in Table A.2 and indicate that Tennessee, Alabama, and Nebraska receive the largest weights when matching pre-waiver premium trends for one or more of the four plan types. In Sensitivity Analysis 1.1, we imposed a penalty that forced the loading of weights on a broader set of states. These weights are located in Table C.1 and the corresponding trends for Minnesota and the alternative comparison group are displayed in Figure C.1. That figure shows that the pre-waiver trends are slightly less parallel between Minnesota and the synthetic comparison group in the sensitivity analysis compared with the main analysis.

Figure 3.3. Average Statewide Individual Marketplace Plan Premiums in Minnesota and Synthetic Comparison States, by Plan and Age, 2015–2020



SOURCE: Authors' analysis using RWJF HIX Compare.
NOTE: The synthetic comparison reflects a weighted average of the statewide premium across 24 comparison states (see Table A.1); some states may receive zero weight (see Table A.2).

Following implementation of the waiver, we estimate that premiums were lower in Minnesota than they would have been in the absence of the waiver for all four plans and that the magnitude of the premium reductions differed substantially across plans (Table 3.1). For example, for a 45-year-old enrollee, the LCB premium was estimated to be $1,058 lower, on average, across the three post-waiver years (a 22% reduction), whereas the premium was $2,599 lower for enrollees who selected the SLCS plan (a 36% reduction). Interestingly, premiums decreased more for the SLCS plan than the LCG plan (a 31% reduction) despite the fact that the premium for the LCG plan was significantly higher in the pre-waiver period. Most of the estimates reported in Table 3.1 reach statistical significance at levels commonly used in policy analysis and social science research ($p \leq 0.10$) providing evidence that the waiver likely contributed to these reductions. Table B.1 indicates that the waiver's estimated impact on premiums is driven by two trends: (1) a *reduction* in premiums in Minnesota after the waiver (for three of the four plan types) and (2) an *increase* in premiums for the comparison group in each year relative to the pre-waiver period (for all four plan types).

We note that the estimated waiver effects on premiums displayed in Table 3.1 are larger than those based on premium data reported by carriers to the state each year that reflect premiums carriers would charge enrollees both with the waiver and in the absence of the waiver. Using data provided by carriers, Minnesota estimates that premiums are approximately 20 percent lower with the waiver than in the absence of the waiver. This suggests that multiple factors including, but not limited to, Minnesota's reinsurance program might have contributed to the larger premium reductions estimated in the current analysis. We explore these possible factors in Chapter 4.

In Sensitivity Analysis 1.1, which allocated weight to a larger number of states within the comparison group, the estimated effects of the waiver on plan premiums were similar in magnitude and statistical significance (Table C.2).

Table 3.1. Estimated Effect on Individual Marketplace Plan Premiums in Minnesota Relative to Synthetic Comparison States Following Waiver Implementation, by Plan, Age, and Year

	LCB		LCS		SLCS		LCG	
	Effect (%)	p-value	Effect (%)	p-value	Effect (%)	p-value	Effect (%)	p-value
Age 27								
2018	–$821	0.05*	–$1,532	0.10*	–$2,328	0.08*	–$1,970	0.05*
2019	–$672	0.12	–$1,599	0.07*	–$1,737	0.16	–$1,768	0.07*
2020	–$810	0.05*	–$1,722	0.06*	–$1,603	0.16	–$1,334	0.12
Overall	–$768 (–22%)	0.05*	–$1,618 (–34%)	0.06*	–$1,889 (–36%)	0.07*	–$1,691 (–31%)	0.04*
Age 45								
2018	–$1,132	0.05*	–$2,111	0.10*	–$3,204	0.08*	–$2,714	0.05*
2019	–$926	0.12	–$2,203	0.06*	–$2,389	0.16	–$2,435	0.08*
2020	–$1,117	0.05*	–$2,373	0.06*	–$2,205	0.16	–$1,835	0.13
Overall	–$1,058 (–22%)	0.05*	–$2,229 (–34%)	0.06*	–$2,599 (–36%)	0.07*	–$2,328 (–31%)	0.04*
Age 64								
2018	–$2,354	0.05*	–$4,383	0.10*	–$6,640	0.08*	–$5,637	0.06*
2019	–$1,926	0.12	–$4,574	0.06*	–$4,945	0.16	–$5,054	0.08*
2020	–$2,323	0.05*	–$4,928	0.06*	–$4,569	0.16	–$3,802	0.13
Overall	–$2,201 (–22%)	0.05*	–$4,628 (–34%)	0.06*	–$5,385 (–36%)	0.07*	–$4,831 (–31%)	0.04*

SOURCE: Authors' analysis using RWJF HIX Compare.
NOTE: We considered p-values ≤0.10 to be statistically significant in this analysis (indicated by *).

The waiver's effect on enrollee premium spending differed across individuals according to their income and their selected plan (Table 3.2). We estimate that enrollees with incomes at 450 percent FPL experienced reductions in enrollee premium spending across all four plans. The estimated waiver effect for these individuals is equivalent to the waiver effects on total premiums

displayed in Table 3.1 because these individuals do not receive subsidies and pay the full plan premium.

Individuals with incomes at 250 percent FPL or 350 percent FPL who select the LCB plan are estimated to have *higher* enrollee premium spending in some cases, although the magnitude of these increases varied by age and income—ranging from $1,122 (age 27 and 250% FPL) to $2,288 (age 64 and 350% FPL). These estimated increases in spending can be explained by the larger reduction in premiums for the SLCS plan relative to the LCB plan (Table 3.1), which implies that an enrollee's subsidy is reduced by a larger extent than the reduction in premium for the LCB plan. Despite increases for some enrollees, other enrollees in the LCB plan did not appear to experience increases in enrollee premium spending.

We did not identify statistically significant changes in enrollee premium spending for individuals with incomes at 250 percent FPL or 350 percent FPL who enrolled in the three other plans we examined. The estimated reductions in enrollee premium spending for individuals age 27 with incomes at 350 percent FPL who selected the LCS plan (–$655), SLCS plan (–$927), or LCG plan (–$728) did not meet thresholds of statistical significance, and we cannot conclude that these reductions were due to the waiver. For these individuals, the estimated reductions are likely driven by the fact that these individuals receive smaller subsidies relative to other enrollees (and possibly no subsidy after the waiver), and thus any reduction in their subsidy is offset by the larger reduction in the premium for their selected plan. For SLCS plan enrollees age 27 with income at 350 percent FPL, the estimated reduction in enrollee premium spending is likely a result of these enrollees' premiums falling below their required contribution after the waiver's implementation. We found similar results in Sensitivity Analysis 1.1, which spread weights across a larger number of comparison states (Table C.3).

Table 3.2. Estimated Effect on Enrollee Premium Spending in Minnesota Relative to Synthetic Comparison States Following Waiver Implementation, by Plan, Age, and Income

	LCB		LCS		SLCS		LCG	
	Effect	p-value	Effect	p-value	Effect	p-value	Effect	p-value
Age 27								
250% FPL	$1,122	0.07*	$271	0.26	$0	1.00	$199	0.74
350% FPL	$195	0.66	–$655	0.29	–$927	0.15	–$728	0.20
450% FPL	–$768	0.05*	–$1,618	0.06*	–$1,889	0.07*	–$1,691	0.04*
Age 45								
250% FPL	$1,324	0.04*	$370	0.24	$0	1.00	$271	0.76
350% FPL	$1,473	0.07*	$303	0.35	–$68	0.24	$203	0.79
450% FPL	–$1,058	0.05*	–$2,229	0.06*	–$2,599	0.07*	–$2,328	0.04*
Age 64								
250% FPL	$812	0.35	$635	0.27	$0	1.00	$554	0.76

350% FPL	$2,288	0.09*	$757	0.27	$0	1.00	$554	0.76
450% FPL	–$2,201	0.05*	–$4,628	0.06*	–$5,385	0.07*	–$4,831	0.04*

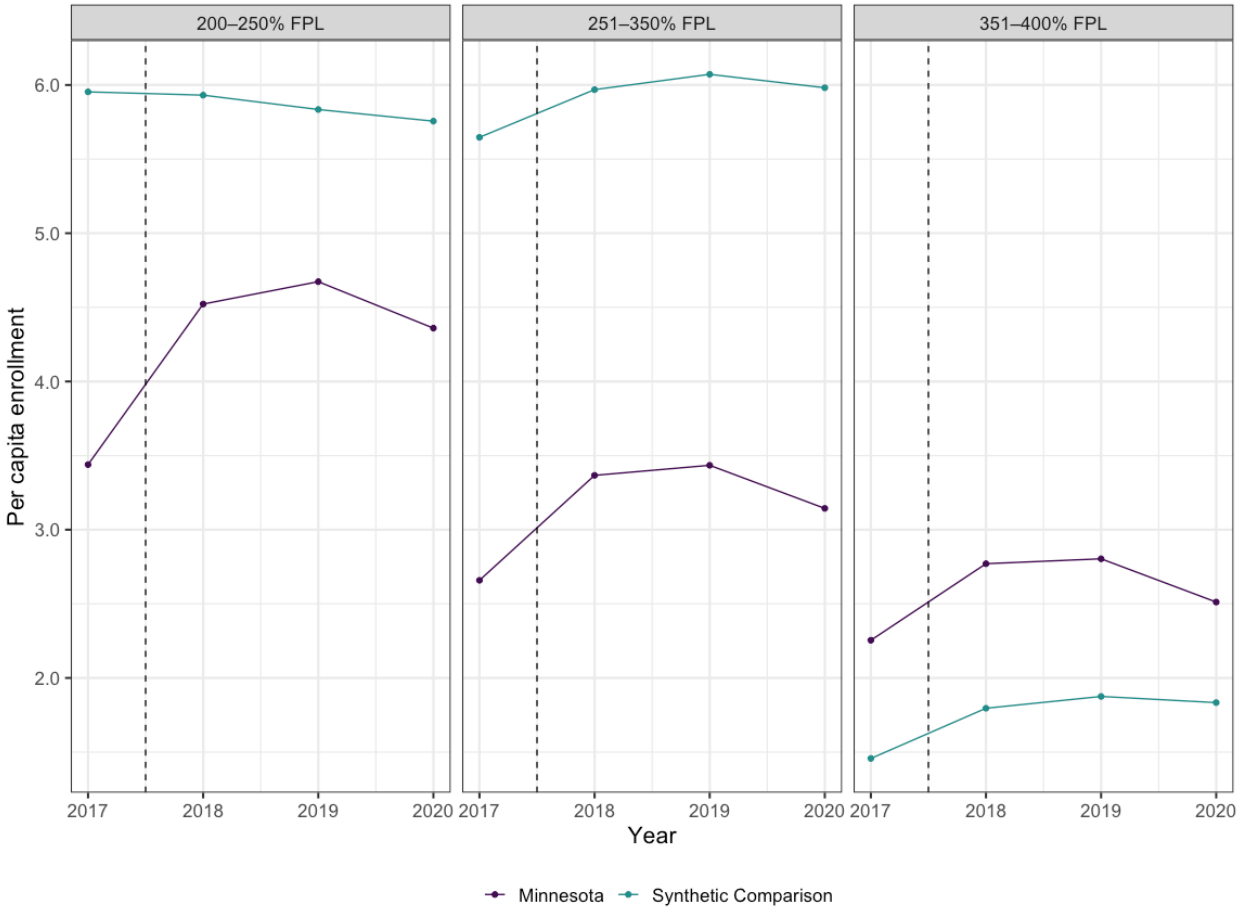
SOURCE: Authors' analysis using RWJF HIX Compare.
NOTE: We considered p-values ≤0.10 to be statistically significant in this analysis (indicated by *).

We conducted an additional sensitivity analysis that used a "triple-difference" approach to estimate the waiver's effect on enrollee premium spending. As described in more detail in Appendix A, Sensitivity Analysis 1.2 calculated differences in premiums between the individual and small group market within each state before comparing trends in these differences between Minnesota and comparison states. We display trends in the within-state premium differences for Minnesota and the comparison group in Figure C.2, and we report the relative weighting of states in the comparison group in Table C.4. The premium reductions due to the waiver were estimated to be similar in magnitude to the those in the main analysis with LCB plan enrollees experiencing the smallest reductions in premiums (Table C.5). Similar to the main analysis, we estimate that LCB plan enrollees had higher premium spending than they would have absent the waiver, although the amount of the increase was slightly smaller than in the main analysis (Table C.6).

Waiver Impact on Enrollment

For each of the three income categories included in the analysis, per capita enrollment increased more in Minnesota than in the comparison group between 2017 and 2018 (the first year of the waiver), while Minnesota experienced larger *decreases* in per capita enrollment between 2019 and 2020 (Figure 3.4). As noted in Chapter 2 above, due to the lack of multiple years of pre-waiver data on enrollment in each income category in Minnesota, we examine the waiver's impact on enrollment within income categories using a comparison group in which all comparison states are weighted equally.

Figure 3.4. Individual Marketplace Plan Enrollment per Capita in Minnesota and Synthetic Comparison States, by Income Category, 2017–2020



SOURCE: Authors' analysis using CCIIO OEP PUFs and enrollment data provided directly by states.
NOTE: The synthetic comparison reflects an average of per capita enrollment across 19 comparison states (200–250% FPL) or 22 comparison states (251–350% FPL and 351–400% FPL) (see Table A.1).

Trends in enrollment for unsubsidized individuals in Minnesota differed substantially from those for individuals in the three income categories (Figure 3.5).[11] Of note, we estimate the waiver effect for the unsubsidized subgroup by modeling trends in *percentage changes in per capita enrollment* from the previous year, because it provided the best match to pre-waiver

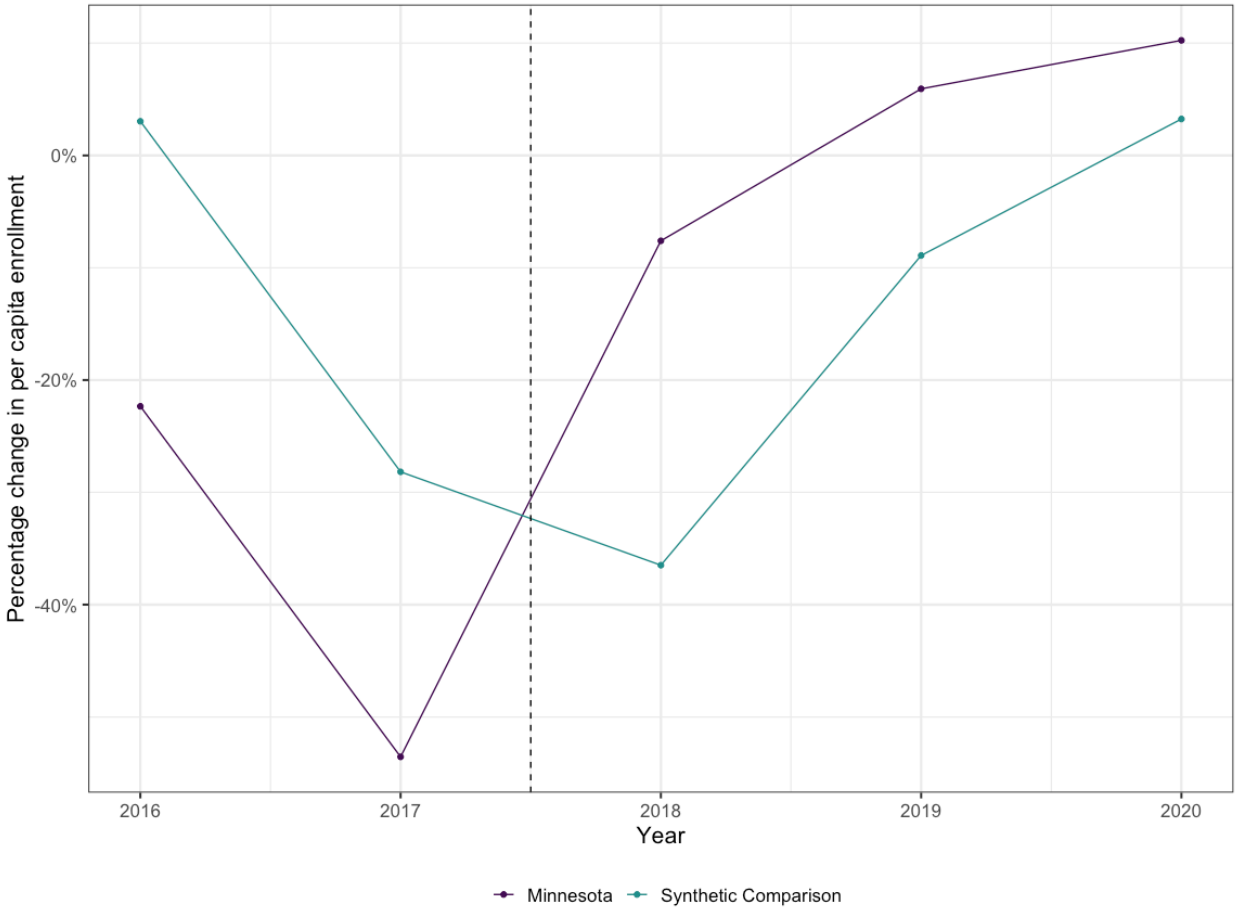
[11] In contrast to the income-stratified analysis described above, we estimate the effect of the waiver on enrollment for unsubsidized individuals using a synthetic comparison group that differentially weights the data from comparison states to optimize matching to Minnesota's pre-waiver enrollment trends. The weights for each comparison state are displayed in Table A.3.

trends between Minnesota and the comparison group for unsubsidized enrollees.[12] We found that enrollment declined sharply in Minnesota during the pre-waiver period and that the decline slowed considerably in 2018—the first post-waiver year. By 2019, Minnesota experienced positive growth in enrollment for its unsubsidized population. By contrast, the pre-period declines in enrollment for the comparison group increased through 2018 before slowing in 2019. By 2020, unsubsidized enrollment began increasing in the comparison group—one year after Minnesota's unsubsidized enrollment began to increase.

In Appendix C we report the results of Sensitivity Analysis 2.1, which matched on per capita enrollment (levels) in each pre-waiver year. Graphical displays of trends for that analysis are shown in Figure C.3, which indicate lack of parallel trends in the pre-waiver period. The synthetic comparison group weights for the sensitivity analysis are reported in Table C.7.

[12] This modeling approach assumes that relative changes in per capita enrollment from one year to the next are not sensitive to enrollment levels in the preceding year.

Figure 3.5. Percentage Change in Individual Market Enrollment per Capita in Minnesota and Synthetic Comparison States for Unsubsidized Enrollees, 2016–2020



SOURCE: Authors' analysis using CCIIO marketplace effectuated enrollment data and EDGE risk adjustment data.
NOTE: The synthetic comparison reflects a weighted average of percentage changes in per capita enrollment across 24 comparison states (see Table A.1).

We found no statistically significant increases in enrollment in Minnesota relative to what we would have expected in the absence of the waiver for individuals within each of the three income categories examined (Table 3.3). Although the estimated waiver effects are positive in each of the three income categories, each estimate reflects considerable uncertainty. However, for unsubsidized enrollees, we estimate that 66,000 more individuals, on average, enrolled in plans than would have done so absent the waiver, and these results were statistically significant. This is a large effect when compared with the unsubsidized enrollment in Minnesota in the year before the waiver (nearly 92,500; see Figure 3.2). Of note, this large effect is explained almost entirely by the waiver's stabilization of enrollment trends, which appears to have occurred faster in Minnesota than in the comparison group, rather than a substantial *increase* in enrollment in Minnesota. Table B.2 displays pre- and post-waiver mean per capita enrollment for both Minnesota and the comparison group and illustrates how enrollment among unsubsidized

individuals declined between the pre- and post-waiver periods in Minnesota, but the decline was smaller than the corresponding decline in the comparison group.

In Sensitivity Analysis 2.1, which matched on enrollment levels rather than percentage changes in enrollment, we found that the waiver's impact on enrollment for unsubsidized individuals was also positive in sign but smaller in magnitude (approximately 22,000 additional unsubsidized enrollees than would have been expected absent the waiver), but, unlike the main analysis, these results were not statistically significant (Table C.8).

Table 3.3. Estimated Effect on Individual Market Enrollment in Minnesota Relative to Synthetic Comparison States Following Waiver Implementation, by Income Category and for Unsubsidized Enrollees, 2018–2020

	Estimated Effect on Enrollment	p-value
200–250% FPL		
2018	6,198	0.74
2019	7,630	0.69
2020	6,325	0.75
Overall	6,717	0.66
251–350% FPL		
2018	2,166	0.89
2019	1,979	0.91
2020	852	0.96
Overall	1,668	0.91
351–400% FPL		
2018	997	0.86
2019	739	0.91
2020	–674	0.92
Overall	356	0.95
Unsubsidized		
2018	48,498	<0.01*
2019	67,183	0.03*
2020	82,455	0.06*
Overall	66,025	<0.01*

SOURCE: Authors' analysis using CCIIO OEP PUFs, marketplace effectuated enrollment data, and EDGE risk adjustment data.
NOTES: We considered p-values ≤0.10 to be statistically significant in this analysis (indicated by *). The analysis of enrollment by income is limited to marketplace plans while unsubsidized enrollment includes both on- and off-marketplace plans.

In Sensitivity Analysis 2.2, we used a triple-difference methodology to estimate the waiver's effect on enrollment for unsubsidized individuals (Figure C.4). The relative weighting of states in the comparison group are included in Table C.9 and indicate that weights were spread across

five states. The waiver's effects on enrollment for unsubsidized individuals, an estimated 38,000 more individuals than would be expected absent the waiver, is consistent in direction with the prior two analyses but, as with the previous sensitivity analyses, these results did not reach conventional thresholds of statistical significance (Table C.10).

4. Discussion and Conclusion

Prior to the implementation of its section 1332 waiver, premium growth in Minnesota's individual market exceeded the national average by fourfold, and enrollment among unsubsidized individuals declined by 63 percent between 2015 and 2017. In response, the state implemented its own subsidy program in 2017, in the form of a 25-percent premium subsidy for individuals who did not qualify for premium tax credits, in order to improve the affordability of premiums. The following year the state implemented the MPSP program in an effort to further stabilize the individual market. Marketplace officials viewed the reductions in premiums that were in line with their expectations and the continued participation of issuers as indicators of the waiver's success. Minnesota's rate review data also show reductions in rates for most carriers across each of the three post-waiver years. Average rate changes ranged from –38 percent to 3 percent in 2018, from –7 to –28 percent in 2019, and from 0.2 percent to –20 percent in 2020, as compared with large rate increases in the years prior to the implementation of the reinsurance program (Minnesota Department of Commerce 2017, 2018, 2019).

We found evidence that Minnesota's waiver was associated, on average across the state, with 22-percent-lower premiums for the LCB plan, 34-percent-lower premiums for the LCS plan, 36-percent-lower premiums for the SLCS plan, and 31-percent-lower premiums for the LCG plan than would be expected in the absence of the waiver. These waiver effects are larger than those estimated by Minnesota marketplace officials based on premium information reported by carriers to the state each year that reflect both with- and without-reinsurance rates.[13] Using data from their carriers, state officials estimate that premiums are approximately 20 percent lower with the waiver than in the absence of the waiver, which may indicate that multiple factors might have contributed to the larger premium reductions estimated in the current analysis apart from the reinsurance program. Such factors might include different market dynamics between Minnesota and our synthetic comparison group, such as differences in pre-waiver market stability, insurer competition, and enrollee demographics. Enactment of other state policies affecting premiums or enrollment after the waiver's implementation could also explain some of the differences if such policies differed between Minnesota and the comparison states.

While *unsubsidized* enrollees realized significant savings in enrollee premium spending, we estimate that spending increased for some subsidy-eligible enrollees in the LCB plan. For these enrollees, the reduction in their subsidy was larger than the reduction in the premium for the LCB plan. The magnitude of these increases varied by age and income—ranging from $1,122

[13] In Minnesota, carriers are required by statute to file rates that they would charge enrollees if there was not a reinsurance program.

(age 27 and 250% FPL) to $2,288 (age 64 and 350% FPL). We did not find statistically significant changes in enrollee premium spending for other subsidy-eligible individuals who enrolled in the three other plans we examined. Two sensitivity analyses replicated these results.

Our analysis suggests that Minnesota's waiver was associated with an estimated 66,000 additional unsubsidized enrollees on average than if the waiver had not been implemented—a result that achieved conventional benchmarks of statistical significance. This is a large effect when compared with the number of unsubsidized enrollees in Minnesota in the year before the waiver (nearly 92,500) and can be explained by a smaller decline in enrollment in Minnesota between the pre- and post-waiver periods relative to a larger decline in the comparison group. This pattern suggests that Minnesota's waiver stabilized enrollment among unsubsidized individuals faster than would have occurred in the absence of the waiver. Although two sensitivity analyses showed a similar pattern in results, neither analysis produced estimates of waiver effects that were statistically significant.

In our analysis of the waiver's effects on enrollees in different income categories, we found no statistically significant increases in enrollment in Minnesota relative to the enrollment expected in the absence of the waiver. The lack of a clear waiver effect in this analysis may be due to the fact that the waiver may not have reduced enrollee premium spending for the subsidized population and might have increased spending for some enrollees.

The direct subsidy program that Minnesota implemented in 2017 could affect the interpretation of the evaluation results, but only for individuals who were ineligible for premium tax credits. For these individuals, we might have *overstated* the waiver's impact on enrollee premium spending by potentially overstating their premium spending in 2017. However, the program would not have affected estimates of the waiver's impact on unsubsidized enrollment as the subsidy program included a special enrollment period that ended in February 2017 and would not affect enrollment in the post-waiver period. Nevertheless, the availability of a direct premium subsidy might have increased awareness and interest in individual market coverage in 2017 among those ineligible for premium tax credit subsidies that could have persisted over the first three years of the waiver.

Minnesota marketplace officials identified a few key interactions between the section 1332 waiver and MinnesotaCare, the state's BHP, which are important when considering the overall impact of the reinsurance program. First, because over 90,000 low-income enrollees receive coverage through MinnesotaCare rather than the marketplace, the amount of federal support for the reinsurance program provided through pass-through funding is proportionally smaller than in other states (CMS, 2021). Second, silver loading in Minnesota, in which CSR payments are incorporated into silver plan premiums, is much smaller than in other states, since the population

eligible for CSR payments in Minnesota is proportionally smaller.[14] This has the effect of limiting the amount of federal funding eligible to support reinsurance due to smaller pass-through payments. Third, since MinnesotaCare is financed through a pass-through mechanism similar to the one used to fund the federal share of Minnesota's section 1332 waiver, reductions in premiums for plans in the individual market as a result of the waiver led to reductions in funding for the BHP on the order of $90–100 million per year. CMS did not hold the state's BHP funding "harmless" from these reductions, which led to losses in funding that Minnesota replaced with state-only funds. Although impacts of the waiver on Minnesota's BHP are outside of the scope of the current analysis, states seeking to implement both BHPs and section 1332 waivers should be aware of the interaction between these two programs (Keith, 2019).

Limitations

Our analysis has several limitations. It is challenging to identify an appropriate comparison group as each state has unique market conditions and policies. Although we constructed a synthetic comparison group that matches Minnesota's pre-waiver trends, there may be other state-specific characteristics that are not accounted for in the analyses. Possible confounding factors include insurer market competition such as the number of issuers, insurer-provider negotiations, network adequacy, consumer demographics, market churn, use of Healthcare.gov or a state's own enrollment website, state-regulated rate increases, and other state programs that affect the individual market or other insurance markets.

There were also concurrent changes during the time period that reinsurance was implemented in Minnesota. For example, many states, including Minnesota, implemented loading policies starting in 2018 in response to federal non-payment of CSRs. Although we include only states with silver loading policies in the synthetic comparison group, loading policies were implemented differently across states and changed over time in some states. Although we excluded from the comparison group states that adopted CSR loading policies other than silver loading in any year between 2018 and 2020 and states with merged individual and small group markets to identify a comparison group that was more similar to Minnesota's individual market, estimates of the waiver's impact could still be biased by the implementation of new programs or changes in market dynamics unrelated to the reinsurance program in either Minnesota or comparison states.

In the sensitivity analyses, we used information about trends in enrollment and premiums in the small group market as part of a triple-difference methodology to attempt to adjust for differences between Minnesota and comparison states that could bias estimates of the waiver's impact. However, differences between the individual market and small group market could still

[14] In Minnesota, enrollees with incomes 200–250% of FPL are eligible for CSRs when enrolling in a silver plan. In states without a BHP, enrollees with incomes 100–250% of FPL are eligible.

lead to divergent trends that would affect our estimates. For example, enrollees in the small group market may differ significantly from enrollees in the individual market in terms of their income or health status. Since small group market enrollees are eligible for neither subsidies nor CSRs, their responses to premium changes may also differ from individual market enrollees who are eligible for both. Finally, any systematic change in employer contributions to premiums over this period would affect small group market enrollees' premium spending independent of the waiver.

In a few of our analyses, our synthetic comparison group methodology allowed a very small number of comparison states to receive a disproportionate level of weighting (see Tables A.2, C.7, and C.9). Allocating weights to one or a few states has some interpretational advantages in that the comparison between Minnesota and a small number of comparison states is relatively straightforward (e.g., one could easily plot the trends for just those few states on a single, interpretable graph). However, allocating weights in this manner also means that the results are more likely to be unduly influenced by idiosyncratic trends in the data of the few comparison states receiving weight.

Because we use state-level enrollment and premium data, the sample size for the regression analyses is small. We restricted states in the synthetic comparison to those that did not have a section 1332 waiver in the time period of interest and those that had a similar individual market structure and CSR loading policy to that of Minnesota. For the enrollment analysis by income, we further excluded a few states with state-based exchanges for which data were not available. Because of the limited sample size, we expect that if the true effect of the waiver is small, there will not have been sufficient power to detect this. Because of the limited pool of comparison states, this is a difficult issue to overcome.

Other cases of missing data created challenges for the analysis. First, the lack of multiple years of pre-waiver enrollment data among individuals in the three income categories of interest made it impossible to confirm the parallel-trends assumption for the income-stratified enrollment analyses. Second, the enrollment data used in the analysis were not available for individuals in specific age, income, and metal tier combinations, which limited our ability to understand how changes in enrollee premium spending across population subgroups defined by these characteristics translated to changes in enrollment. Additionally, while effectuated enrollment data are more accurate than plan selection data, only the latter were available for our analyses of enrollment by income level, though we note that the data are consistent within each analysis. Finally, the EDGE risk adjustment data are complete as of the data submission deadline, but any changes in enrollment or claims after that date would not be represented. However, we note that the measure is consistent across the years and states in which the EDGE data were used.

Future Directions

Lessons Learned

A key finding from the analysis is that reinsurance improved the affordability of coverage primarily for unsubsidized enrollees, and that it appeared to stabilize the pre-waiver enrollment declines for this population faster than in the absence of the waiver. However, the extent to which enrollment was higher for other groups than in the absence of the waiver was harder to determine conclusively and may depend on a far wider range of factors than simply changes in enrollees' premium spending such as their prior experiences with marketplace enrollment, elimination of the individual mandate penalty, and changes in the availability of other sources of insurance. Qualitative data collection could help to further interpret trends in enrollment for enrollees in different income categories. Further, given the limited power of most analyses, states might need to rely on triangulation of findings and sensitivity analysis (including the use of alternative comparison groups) to test the robustness of their conclusions about the waiver's effects.

Another key lesson was that reinsurance could lead to reductions in affordability for individuals that are eligible for subsidies. For example, we found that some enrollees in the LCB plan may have experienced higher premium spending than in the absence of the waiver. This highlights the possibility that reinsurance could worsen affordability for some subsidized enrollees if APTCs fall by an amount that exceeds the premium reduction for their selected plan. Closer examination of the enrollment patterns of these individuals may be valuable to better understand whether reduced affordability leads to disenrollment. In addition, states might consider changes to the design of their reinsurance programs to enhance the affordability of coverage for subsidy-eligible enrollees.

Finally, reinsurance programs are implemented in a complex policy environment and can interact with existing policies and programs. As we note above, Minnesota's BHP received significantly less funding after reinsurance was implemented, causing the state to identify alternative sources of funding. As discussed below, the American Rescue Plan also has implications for reinsurance since it expands subsidies to individuals who were most likely to benefit from reinsurance programs. As a result, states may need to make a more comprehensive assessment of the benefits and costs to the state of reinsurance relative to existing state or federal programs.

Future research on reinsurance programs could address methodological limitations of the current analysis and cover additional research questions. Future analyses could try to account for differences between states that might affect trends in premiums or enrollment; however, factors such as those related to how insurers determine rate requests and how states finalize rate increases are difficult to quantify. Future evaluations may also benefit from more focus on qualitative data collection to better understand the unique circumstances in the waiver state and how to best construct a comparator. Future research could also compare existing reinsurance

programs across multiple states and provide policy recommendations for states considering implementation of a new reinsurance program or changes to an existing program. Furthermore, simulation analyses could be used to compare specific parameters of a given reinsurance model (e.g., comparison of attachment points, coinsurance rates, and payment caps within a claims-based reinsurance program, or claims- vs. conditions-based reinsurance program). Additionally, as described in the next subsection, explicit consideration of health equity will be important in future evaluations of waiver programs.

Health Equity Considerations

Although our evaluation finds that reinsurance primarily benefits individuals with incomes above 400 percent of FPL, these programs can promote health equity goals by reducing gaps in coverage and affordability between certain population groups. Reinsurance can reduce disparities in coverage between individuals eligible for subsidies and lower-income adults who are just over the income-eligibility threshold—many of whom are older adults with modest incomes. Reinsurance could also encourage new issuers to begin offering coverage in a state or encourage existing issuers to expand into new markets, which could promote competition and further drive down premiums and improve affordability, particularly for unsubsidized enrollees in rural areas, which tend to have fewer participating issuers than urban areas (McDermott and Cox, 2020). Finally, reinsurance could reduce the tendency of issuers to use narrow provider networks as a strategy to control costs, which could reduce disparities in access to providers for enrollees with specific health care needs and preferences. For example, provider choice may be particularly important for patients with specific health conditions; those who prefer receiving care from providers with a similar race, ethnicity, gender, or language-preference; or providers that are more likely to support patients in addressing their health-related social needs such as housing and nutrition assistance.

Given the potential impact of reinsurance on health equity, evaluations of reinsurance programs would ideally include a health equity impact assessment. This type of assessment would require enrollment data stratified by enrollee characteristics such as race/ethnicity, income, and geography, including combinations of these characteristics. Although characteristics such as race/ethnicity are reported on a voluntary basis at the time of enrollment and may be incomplete, validated methods are available to estimate race and ethnicity using enrollee-level information (e.g., surname and address) in conjunction with U.S. census data (Elliott et al., 2009). The assessment might replicate the analyses presented in this report, including an assessment of the reinsurance program's effect on enrollment stratified by race/ethnicity and geography (as opposed to simply income). Analyses of enrollee premium spending could be conducted at the rating area level as well as the state level to quantify differences in the program's effect between urban and rural areas. Additional analyses might include changes in the availability of zero premium plans for different population groups, and changes in the number of issuers offering coverage to different population groups. Enrollee-level data on plan

selections could also be used to determine whether reinsurance reduces disparities in affordability across population groups. For example, analysis of changes in enrollee premium spending for different populations in distinct metal tiers could identify population groups that could benefit from switching into plans in higher metal tiers with little or no change in enrollee premium spending.

Implications of the American Rescue Plan

The American Rescue Plan made substantial changes to the ACA's premium tax credit structure for 2021 and 2022. First, the American Rescue Plan extended premium tax credits to people with incomes above 400 percent of FPL who do not have an affordable health insurance offer from another source. Second, the American Rescue Plan reduced applicable percentage contributions (the share of income that a premium tax credit-eligible individual is required to pay for a benchmark plan) for people at all income levels, which in turn increased the size of the subsidies that people can receive. Without the American Rescue Plan, applicable percentage contributions for 2021 would have ranged from 2.07 percent of income for eligible enrollees at 100 percent of the FPL to 9.83 percent of income for eligible enrollees with income between 300 and 400 percent of FPL (IRS, 2020). With the American Rescue Plan, applicable percentage contributions were reduced to zero for premium tax credit-eligible people with incomes below 150 percent of FPL and ranged up to a maximum of 8.5 percent of income for those with incomes above 400 percent of FPL (H.R. 1319, 117th Congress). Because the applicable percentage contributions cap spending for the benchmark plan as a percentage of income, they insulate enrollees from premium increases if they enroll in the benchmark plan.

By extending premium tax credits to people with incomes above 400 percent of FPL, the American Rescue Plan reduced the size of the unsubsidized population that is most likely to benefit from reinsurance. Additionally, by expanding subsidies to a larger population, and by increasing the subsidies' value, the American Rescue Plan may attract a larger pool of healthy people to the individual insurance market, potentially stabilizing premiums. Because state reinsurance programs are typically funded through state general funds and/or broad-based taxes, state policymakers may determine that reinsurance is a low-priority investment alongside the American Rescue Plan, which uses federal dollars to improve the affordability and stability of the market. Yet, reinsurance could still offer benefits for the state. For example, in an analysis examining a post-American Rescue Plan scenario for a section 1332 waiver, actuaries for the state of Colorado estimated that reinsurance would lead to a 19.2-percent reduction in premiums in 2022, even after accounting for the effects of the American Rescue Plan (Colorado Division of Insurance, 2021). In addition, with more subsidized consumers enrolled in light of the American Rescue Plan—either because they were eligible prior to the American Rescue Plan and subsequently enrolled after the increased premium tax credit generosity, or because they were newly eligible for premium tax credit—the size of federal pass-through funding available to the state due to reduced premiums is larger, as the federal government achieves additional premium

tax credit savings due to reinsurance (U.S. Department of the Treasury, 2021). Reinsurance also creates benefits for several categories of enrollees, including people who pay less than 8.5 percent of income for premiums and adults with incomes below the poverty line in states that opted not to expand their Medicaid programs. It also includes those subject to the so-called family glitch, which precludes premium tax credit receipt among people with an affordable offer of single employee coverage, even if premiums for dependent coverage are more than 8.5 percent of income (Cox et al., 2021), and those offered affordable individual coverage health reimbursement arrangements (ICHRAs), who are also ineligible for premium tax credits. When the American Rescue Plan's subsidy enhancements expire in 2023, the need for reinsurance may grow as the size of the unsubsidized population reverts to pre-pandemic levels.

Conclusion

Prior to the implementation of its waiver, premium growth in Minnesota exceeded the national average and enrollment among unsubsidized individuals had dropped precipitously. Minnesota's waiver was associated with lower premiums across all plans offered in the marketplace. Further, the waiver program appears to have stabilized enrollment trends among unsubsidized individuals more rapidly than would have occurred in the absence of the waiver. At the same time, enrollee premium spending may have increased for lowest cost bronze enrollees whose subsidies were reduced as a result of the waiver. We are unable to conclude definitively whether subsidy-eligible enrollees experienced increases or decreases in enrollment because of the waiver.

Appendix A. Detailed Methodology

Description of Data Sources

Robert Wood Johnson Foundation HIX Compare Data

Description: The RWJF produces research-ready data files containing information about individual and small group plans offered both on and off the marketplace. Premium information is available for both individual and family coverage for enrollees with different ages for plans available in each rating area in a given state.
Data structure: Plan-rating area level
Years analyzed: 2015–2020
Use: We use these files to measure statewide premiums for the four types of marketplace plans specified in Evaluation Question 1 (LCB, LCS, SLCS, and LCG) for individuals with selected ages and incomes from 2015 to 2020.

CCIIO Open Enrollment Period Public Use Files

Description: The OEP-PUFs contain state-level information on enrollment in marketplace plans in the individual market for both Healthcare.gov states and state-based exchanges. These files include data on applications and plan selections during the OEPs through the exchanges and therefore do not include off-marketplace enrollment.
Data structure: State level
Years analyzed: 2015–2020
Use: We used these state-year files to measure state-level trends in enrollment in individual market plans that are offered on the marketplace for enrollees with incomes between 200 and 250 percent of FPL, 251–350 percent, and 351–400 percent in both Minnesota and comparison states.

CCIIO Marketplace Effectuated Enrollment Tables

Description: CCIIO's full-year marketplace effectuated enrollment tables provide counts of the average number of individuals with active policies per month during the calendar year. These individuals have signed up for a marketplace plan and have paid premiums, if relevant.
Data structure: State level
Years analyzed: 2015–2020
Use: We used state-level enrollment for subsidized enrollees in these tables to derive state-level trends in enrollment for unsubsidized individuals. Specifically, we estimate unsubsidized enrollment across both on- and off-marketplace plans in each state by calculating the difference

between total individual market enrollment in the CCIIO EDGE risk adjustment summary data (described below) and subsidized enrollment from the marketplace effectuated enrollment tables. Enrollment in the marketplace effectuated enrollment tables is measured as the average monthly enrollment across the 12 months in each calendar year.

CCIIO External Data Gathering Environment Risk Adjustment Summary Data

Description: The EDGE data contain plan-level information about individuals who signed up for a plan and paid premiums that is used for risk adjustment. These files do not include grandfathered plans and grandmothered plans that are not covered by the ACA risk adjustment program.
Data structure: Plan level (data were aggregated to the state level by the CCIIO Payment Policy & Financial Management Team)
Years analyzed: 2015–2020
Use: We used these data to measure state-level trends in enrollment for unsubsidized individuals who enrolled in individual market plans. We used the EDGE risk adjustment summary data to measure state-level enrollment in all individual market plans and then subtracted state-level enrollment for subsidized individuals compiled from CCIIO marketplace effectuated enrollment tables (CMS, 2020) to estimate unsubsidized enrollment. Enrollment in the EDGE risk adjustment summary data is measured in enrollment days, which was aggregated to member months in the file prepared by CCIIO for this analysis. We divide member months by 12 to estimate average monthly enrollment in each calendar year.[15] We also used average monthly enrollment in small group market plans in sensitivity analyses.

CCIIO Medical Loss Ratio Files

Description: The Medical Loss Ratio (MLR) files contain information about enrollment, premiums, and expenditures for qualified health plans (QHPs), grandfathered plans, and grandmothered plans in each state. For QHPs, this includes plans that are offered both on and off marketplace.
Data structure: Issuer level
Years available: 2015–2019
Use: We used these files to measure state-level enrollment in plans in sensitivity analyses. Because EDGE risk adjustment data for the small group market was available to us only for the

[15] Member months in the EDGE risk adjustment summary data and in the CCIIO marketplace effectuated enrollment tables are calculated in slightly different ways. In the EDGE risk adjustment summary data, enrollment *days* are aggregated to member months for each calendar year whereas in the CCIIO marketplace effectuated enrollment data tables, *monthly* enrollment counts are averaged across the 12 months of each calendar year.

past three years, we relied on the MLR data for the small group market for 2015–2019 and imputed small group enrollment in 2020 using EDGE risk adjustment data.[16]

Choice of Comparison Group

"Synthetic comparators" are commonly used in policy analysis when the unit of observation is large, such as a state. To estimate the impact of a policy in the state of interest, outcomes from comparison states that are not exposed to the policy are combined and weighted to match the pre-policy trends for the state of interest. Any departure in trends following the implementation of the policy is then interpreted as the impact of the policy.

We follow the approach of Arkhangelsky et al. (2019) to reweight a set of non-waiver comparison states that is customized to Minnesota into a synthetic comparison group, so that the assumption of pre-waiver parallel trends is satisfied. Specifically, we select $\omega = (\omega_1, \ldots, \omega_J)$ to satisfy the following minimization problem:

$$(\omega_0, \omega) = \arg\min_{\omega \in \Omega} \sum_{t=2014}^{2017} \left(\omega_0 + \sum_{i=1}^{J} \omega_i \, Y_{it} - Y_{0t} \right)^2 + \zeta^2 \parallel \omega \parallel_2^2.$$

In the equation, the outcome value for the waiver state in year t is Y_{0t}, and the outcome value of the ith comparison state in year t is Y_{it}. The weights ω are restricted to the set Ω of all non-negative weights that sum to 1. The penalty term ζ controls the extent to which the weights are allowed to concentrate on a single comparison state. This weighting ensures that the pre-waiver trends are parallel because the difference in the pre-waiver outcome between the synthetic comparison state and Minnesota $\sum_{i=1}^{J} \omega_i \, Y_{it} - Y_{0t}$ is chosen to be approximately equal to ω_0 in all pre-waiver years. A unique set of weights was developed for the synthetic comparison groups used for each stratification of interest for the two research questions. Each set of weights balances the pre-waiver outcomes but not any other state-level characteristics.

A strength of the synthetic comparison method is its ability to select the most comparable states with Minnesota. When appropriate, the synthetic comparison method combines information from multiple comparison states, thus reducing the likelihood that any one state will unduly influence the outcome. When only a single comparison state is sufficiently similar to Minnesota in the pre-waiver period, it automatically finds and compares Minnesota with that state. Even when no single comparison state has comparable pre-waiver trends with Minnesota, the synthetic comparison group may yet closely match the pre-waiver trends.

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[16] To impute small group market enrollment in 2020, we calculated the ratio of small group market enrollment in the 2019 MLR data and CCIIO's 2019 EDGE risk adjustment data and applied this ratio to the 2020 small group market enrollment estimates in the EDGE risk adjustment data. We used the MLR data as the primary data source for enrollment in the small group market because it was available for more years (2015–2019) than the corresponding EDGE risk adjustment data (2017–2020), which is subject to a three-year retention policy.

Operationalizing the Synthetic Comparison Group

We construct the synthetic comparison group from a pool of comparison states chosen based on waiver status and "silver loading" approach. The comparison states exclude those with an approved 1332 waiver at any point between 2018 and 2020, leaving 36 states and Washington, D.C., as possible comparison states (KFF, 2020).[17]

To account for silver loading approaches that affect premiums, we also exclude states that adopted a different silver loading approach from Minnesota. Following the elimination of federal funding for CSR subsidies under the Trump administration in 2017, most states allowed insurers to "load" CSR costs onto plan premiums. However, states differed in the type of loading allowed. "Silver loading" increased premiums on the silver tier, while "broad loading" increased premiums across all metal tiers. Furthermore, some states loaded costs onto all silver plans while other states opted for "silver switch" (or "silver switcheroo") that allowed insurers to load CSR costs onto on-marketplace silver plans only, leaving off-marketplace silver premiums unaffected by the loading. In 2018, 15 states opted to silver load on all silver plans and 21 states opted to silver switch (including Minnesota) (Anderson et al., 2018). In 2019, more states transitioned to the silver switch approach, with 11 states opting to load on all silver plans and 31 states opting for silver switch.

Including non-waiver states and states with silver loading policies (silver load or silver switch), the pool of potential comparison states consisted of the following 25 states: Alabama, Arkansas, California, Connecticut, Florida, Idaho, Iowa, Kansas, Kentucky, Louisiana, Massachusetts, Michigan, Missouri, Nebraska, Nevada, New York, North Carolina, Ohio, South Carolina, South Dakota, Tennessee, Utah, Virginia, Washington, and Wyoming. We further excluded Massachusetts, a state that merged its individual and small group markets, leaving a sample of 24 comparison states.

We selected the synthetic comparison weights to closely approximate the parallel-trends assumption by minimizing the penalized squared differences in pre-waiver outcomes (see equation above). Additionally, we visually inspected the trends in Minnesota compared with the trends in the synthetic comparison group to ensure that they did not markedly deviate from parallel in the pre-waiver period.

To address departures from parallel trends we considered two options. First, we set the model's penalization term to 0. The penalty term ζ disperses the weights over more comparison states, which has appealing theoretical properties, but setting $\zeta = 0$ allowed greater enforcement of parallel trends. If this approach did not achieve parallel trends, we matched on *relative changes* in outcomes, $100 \times \delta_{jt}/Y_{jt-1}$ (Abadie, 2019) as opposed to matching on the *levels* of outcomes in each pre-waiver year.

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[17] We include comparison states that have approved section 1332 waivers for programs that begin after 2020. For example, Pennsylvania and New Hampshire have approved waivers for reinsurance programs that will begin in 2021. We include these as comparison states for this analysis, which focuses on waiver impacts through 2020.

Estimating the Waiver Impact

In Table A.1, we specify the composition of the synthetic comparison group for each research question and each stratified analysis. The income-stratified analysis for Research Question 1 contains fewer states in the comparison group compared with other analyses as we were unable to obtain enrollment data for one or more income groups from five state-based exchanges. In Table A.2, we specify the relative weights for each state in the synthetic control group for each analysis. The synthetic comparison group differs for each stratification in order to optimize the matching of pre-waiver trends to those in Minnesota for each outcome measure.

Table A.1. States Included in the Synthetic Comparison Group by Research Question

Research Question	Comparison States
Q1. What is the waiver's impact on enrollee premium spending for representative individuals (by age and income) for each of the following on-marketplace plans: LCB LCS SLCS LCG?	24 states (Ala., Ariz., Calif., Conn., Fla., Iowa, Idaho, Kans., Ky., La., Mich., Mo., N.C., Nebr., Nev., N.Y. Ohio, S.C., S.D., Tenn., Utah, Va., Wash., Wyo.)
Q2. What is the waiver's impact on individual market enrollment for the following types of enrollees: 200–250% of FPL 251–350% of FPL 351–400% of FPL?	19 states for the 200–250% FPL analysis (Ala., Ariz., Fla., Iowa, Kans., Ky., La., Mich., Mo., N.C., Nebr., N.Y., Ohio, S.C., S.D., Tenn., Utah, Va., Wyo.) 22 states for the 251–350% FPL and 351–400% FPL analysis (Ala., Ariz., Calif., Conn., Fla., Iowa, Kans., Ky., La., Mich., Mo., N.C., Nebr., N.Y., Ohio, S.C., S.D., Tenn., Utah, Va., Wash., Wyo.)
Unsubsidized	24 states for the unsubsidized analysis (Ala., Ariz., Calif., Conn., Fla., Iowa, Idaho, Kans., Ky., La., Mich., Mo., N.C., Nebr., Nev., N.Y. Ohio, S.C., S.D., Tenn., Utah, Va., Wash., Wyo.)

Table A.2. Synthetic Comparison Group Weights for Research Question 1 (Main Analysis)

	Age 27				Age 45				Age 64			
State	**LCB**	**LCS**	**SLCS**	**LCG**	**LCB**	**LCS**	**SLCS**	**LCG**	**LCB**	**LCS**	**SLCS**	**LCG**
Alabama	0.000	**0.509**	0.013	0.008	0.000	**0.509**	0.013	0.008	0.000	**0.509**	0.013	0.008
Arkansas	0.000	0.002	0.013	0.008	0.000	0.002	0.013	0.008	0.000	0.002	0.013	0.008
California	0.004	0.002	0.013	0.008	0.004	0.002	0.013	0.008	0.004	0.002	0.013	0.008
Connecticut	0.092	0.002	0.013	0.008	0.092	0.002	0.013	0.008	0.092	0.002	0.013	0.008
Florida	0.000	0.002	0.013	0.008	0.000	0.002	0.013	0.008	0.000	0.002	0.013	0.008
Iowa	0.000	0.002	0.013	0.008	0.000	0.002	0.013	0.008	0.000	0.002	0.013	0.008
Idaho	0.000	0.002	0.013	0.008	0.000	0.002	0.013	0.008	0.000	0.002	0.013	0.008
Kansas	0.000	0.002	0.013	0.008	0.000	0.002	0.013	0.008	0.000	0.002	0.013	0.008
Kentucky	0.000	0.002	0.013	0.008	0.000	0.002	0.013	0.008	0.000	0.002	0.013	0.008
Louisiana	0.006	0.002	0.013	0.008	0.006	0.002	0.013	0.008	0.006	0.002	0.013	0.008
Michigan	0.016	0.002	0.013	0.008	0.016	0.002	0.013	0.008	0.016	0.002	0.013	0.008
Missouri	0.000	0.002	0.013	0.008	0.000	0.002	0.013	0.008	0.000	0.002	0.013	0.008
North Carolina	0.027	0.002	0.013	0.008	0.027	0.002	0.013	0.008	0.027	0.002	0.013	0.008
Nebraska	0.000	0.002	0.013	**0.623**	0.000	0.002	0.013	**0.623**	0.000	0.002	0.013	**0.623**
Nevada	0.000	0.002	0.015	0.017	0.000	0.002	0.015	0.017	0.000	0.002	0.014	0.017
New York	0.000	0.002	0.013	0.008	0.000	0.002	0.013	0.008	0.000	0.002	0.013	0.008
Ohio	0.000	0.002	0.013	0.076	0.000	0.002	0.013	0.076	0.000	0.002	0.013	0.076
South Carolina	0.000	0.002	0.013	0.008	0.000	0.002	0.013	0.008	0.000	0.002	0.013	0.008
South Dakota	0.000	0.002	0.102	0.008	0.000	0.002	0.103	0.008	0.000	0.002	0.103	0.008
Tennessee	**0.850**	0.452	**0.618**	0.119	**0.850**	0.452	**0.619**	0.120	**0.850**	0.452	**0.619**	0.121
Utah	0.000	0.002	0.013	0.008	0.000	0.002	0.013	0.008	0.000	0.002	0.013	0.008
Virginia	0.000	0.002	0.013	0.008	0.000	0.002	0.013	0.008	0.000	0.002	0.013	0.008
Washington	0.000	0.002	0.013	0.008	0.000	0.002	0.013	0.008	0.000	0.002	0.013	0.008
Wyoming	0.000	0.002	0.013	0.008	0.000	0.002	0.013	0.008	0.000	0.002	0.013	0.008

NOTE: The state receiving the largest weight is indicated in bold.

Table A.3. Synthetic Comparison Group Weights for Research Question 2 (Main Analysis)

State	200–250% of FPL	251–350% of FPL	351–400% of FPL	Unsubsidized
Alabama	0.053	0.045	0.045	0.030
Arkansas	0.053	0.045	0.045	0.033
California	–	0.045	0.045	0.019
Connecticut	–	0.045	0.045	0.045
Florida	0.053	0.045	0.045	0.039
Iowa	0.053	0.045	0.045	0.038
Idaho	–	–	–	0.037
Kansas	0.053	0.045	0.045	0.053
Kentucky	0.053	0.045	0.045	0.042
Louisiana	0.053	0.045	0.045	0.071
Michigan	0.053	0.045	0.045	0.031
Missouri	0.053	0.045	0.045	0.064
North Carolina	0.053	0.045	0.045	0.044
Nebraska	0.053	0.045	0.045	0.072
Nevada	–	–	–	0.019
New York	0.053	0.045	0.045	0.032
Ohio	0.053	0.045	0.045	0.040
South Carolina	0.053	0.045	0.045	0.055
South Dakota	0.053	0.045	0.045	0.049
Tennessee	0.053	0.045	0.045	0.093
Utah	0.053	0.045	0.045	0.033
Virginia	0.053	0.045	0.045	0.021
Washington	–	0.045	0.045	0.019
Wyoming	0.053	0.045	0.045	0.019

NOTE: Income-stratified enrollment data were not available for California, Connecticut, Idaho, Nevada, and Washington for one or more analyses.

We estimated a weighted two-way fixed effects regression. Specifically, we solved the following weighted least squares problem for the effect of interest τ:

$$\arg\min_{\tau,\mu,\alpha,\beta,\gamma}\left\{\sum_{i=0}^{J}\sum_{t=2014}^{2020}(Y_{it}-\mu-\alpha_i-\beta_t-W_{it}\tau)^2\,\omega_i\lambda_t\right\}$$

where W_{it} is 1 for Minnesota after implementation of the waiver and is 0 otherwise. As it is written above, τ represents the average effect of the waiver over all post-waiver years. We also estimate year-specific effects for each post-waiver year. In addition to the synthetic control weights ω, the weighted least squares equation also includes time weights λ. The time weights are constructed similarly to the synthetic comparison weights, but instead of reweighting comparison states, they reweight the study years so that the most relevant pre-waiver years receive more weight in the analysis. Specifically, the weights are constructed to minimize the difference between the pre- and post-waiver outcomes among the comparison states.

p-values

We contextualize the size of our effect estimates by determining how the magnitude of the estimated effect compares with a *null distribution*, or the distribution that the effect would take due to random chance in the absence of any true effect. Because there are few pre-waiver years and only a single waiver state of interest, we have limited methods for computing a null distribution. To approximate the null distribution, we make use of the comparison states, where no waiver was implemented and thus where we would expect there to be no true effect. We compute the effect that we would estimate in the year following the waiver implementation if we were to label one of the comparison states as the waiver state and omit Minnesota from the data. We repeat this process for each comparison state. We also compute the corresponding estimates for the year before waiver implementation to increase the granularity of the placebo distribution. These estimates are collected into a distribution of placebo effects that can be considered a null distribution for each estimated single-year effect for Minnesota. We compute the single-year p-value as the proportion of null distribution effects that are larger in magnitude than the observed effect. We compute the p-value for the overall effect (which is an average over all post-waiver years) by computing similar averages on the distribution of placebo effects for each comparison state. When the placebo distribution includes placebo effects for each of four years (2017–2020) but the post-waiver period is only three years (2018–2020), we take all possible three-year averages of the four placebo effects for each comparison state.

This approach encodes two assumptions about variability. First, it assumes that the variability we observe in fitting the model to comparison states is representative of the variability in Minnesota. This can be thought of as a type of homoscedasticity assumption and is common in settings such as these where there is only a single treated state and limited ability to characterize its inherent variability. Secondly, we assume that placebo effects computed in different years may be collected into a single placebo effect distribution. This is another type of homoscedasticity assumption. Because of having relatively few comparison states, this assumption is both difficult to verify and likely needed to obtain sufficient resolution on p-values.

Triple-Difference Methodology

As a sensitivity analysis, we applied a triple-difference methodology, an extension of the difference-in-differences methodology that can address bias due to factors that may differ between Minnesota and the synthetic comparison group. For example, insurer competition, consumer attitudes toward purchasing health insurance, and state policy decisions might affect enrollment or premiums in ways that could differ between Minnesota and comparison states. In particular, CMS changed the standard age rating curve in 2018, although several states have

elected to continue using their existing rating curves,[18] which could cause a divergence in premiums in these states relative to Minnesota. Because the age-rating curve used in the small group market was identical to the age-rating curve used in the individual market during the study period for all states included in the analysis, we can "remove" the impact of this potential source of bias by first calculating *within-state* differences in each outcome: the difference in enrollment between the individual market and small group market in each state. When comparing Minnesota with the synthetic comparison group, this within-state difference may be less sensitive to state-specific factors to the extent that they affect the individual and small group markets in similar ways. After redefining the outcome as a within-state difference, the selection of synthetic comparison weights and estimation of the difference-in-differences regression would proceed as specified above. To confirm the assumptions required for use of this method, we assessed whether trends in outcomes for each within-state difference in Minnesota and the synthetic comparison group were parallel in the pre-waiver period.

Despite the potential benefits of using the triple-difference methodology, there are also several potential drawbacks. First, enrollees in the small group market may differ significantly from enrollees in the individual market (e.g., they may be more likely to be employed and may differ in income and health status). Second, most individual market enrollees receive subsidies and many are eligible for CSR, whereas small group market enrollees are eligible for neither, which may lead to differences between the two groups in terms of responses to premium changes over time. Third, any systematic change in employer contributions to premiums over this period would affect small group market enrollees' premium spending independent of the waiver. These factors may lead to divergent trends between the individual and small group markets that could distort estimates of the waiver's impact. Finally, information on enrollment by income in the small group market is not available in administrative data sources.

[18] Massachusetts and Utah used their own age-rating curve from 2014 through 2017 and opted to continue using the same curve in 2018 and beyond.

Appendix B. Additional Tables and Figures

Detailed Results for Impact Analyses

Table B.1. Pre- and Post-Waiver Mean Premium, 45-Year-Old Individual

	LCB	LCS	SLCS	LCG
Pre-waiver mean, Minnesota	3,634	5,279	5,031	5,939
Pre-waiver mean, Comparison group	3,814	5,753	5,526	6,761
Post-waiver mean, Minnesota	3,728	4,337	4,574	5,309
Post-waiver mean, Comparison group	4,966	7,040	7,668	8,459

NOTE: “Pre-waiver” means reflect premiums from 2015 to 2017 and incorporate the time weights described in Appendix A; “post-waiver” means reflect average premiums from 2018 to 2020.

Table B.2. Pre- and Post-Waiver Mean per Capita Enrollment

	Unsubsidized	200–250% FPL	251–350% FPL	351–400% FPL
Pre-waiver mean, Minnesota	20.0	3.4	2.7	2.3
Pre-waiver mean, Comparison group	14.0	6.0	5.6	1.5
Post-waiver mean, Minnesota	16.5	4.5	3.3	2.7
Post-waiver mean, Comparison group	6.7	5.8	6.0	1.8

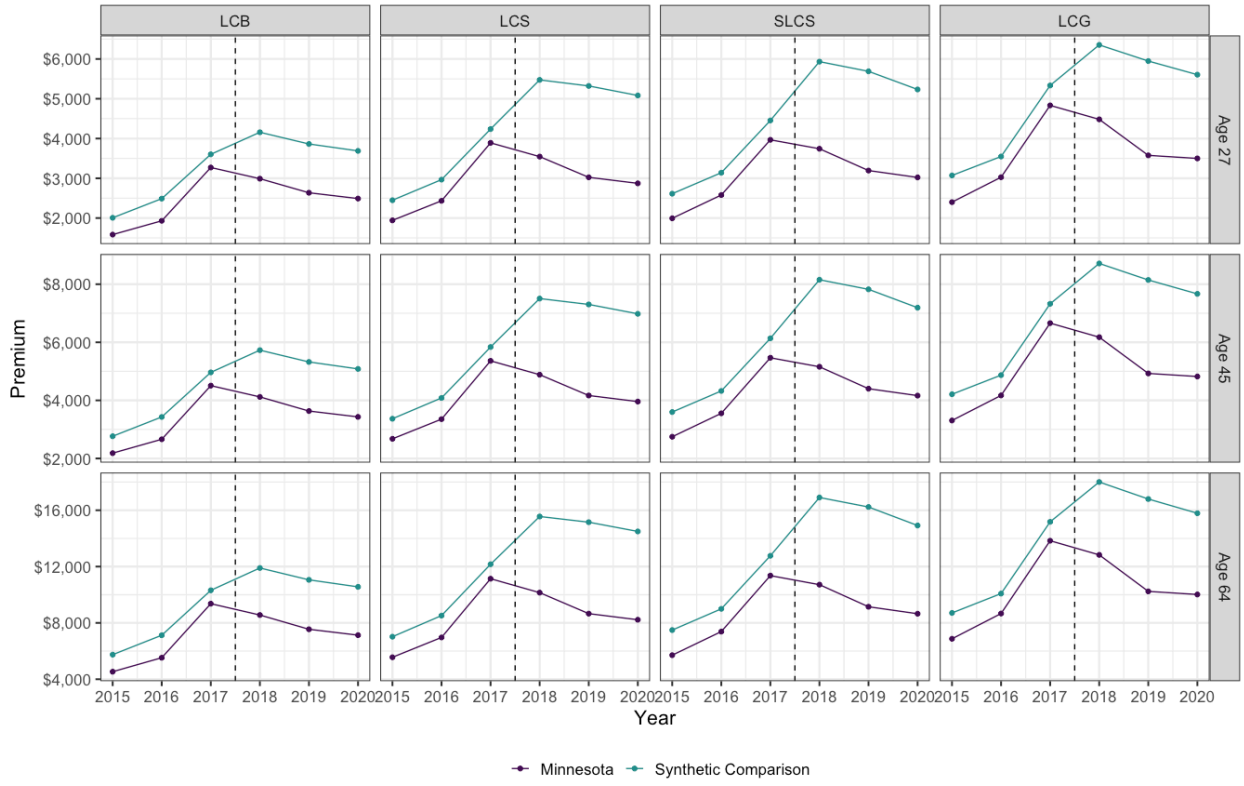
NOTES: “Pre-waiver” means reflect enrollment from 2015 to 2017 (for unsubsidized enrollees) and 2017 (for enrollees in each of the three income categories). The pre-waiver means incorporate the time weights described in Appendix A. “Post-waiver” means reflect average enrollment from 2018 to 2020. Per capita enrollment is calculated as individual market enrollment in the stratification divided by the state population.

Appendix C. Sensitivity Analyses

Research Question 1 Sensitivity Analyses

Sensitivity Analysis 1.1: Difference-in-Differences Analysis with State Weight Penalty

Figure C.1. Sensitivity Analysis 1.1: Average Statewide Individual Marketplace Plan Premiums in Minnesota and Synthetic Comparison States, by Plan and Age, 2015–2020



SOURCE: Authors' analysis using RWJF HIX Compare.
NOTE: The synthetic comparison reflects a weighted average of the statewide premium across 24 comparison states (see Table A.1); some states may receive zero weight (see Table C.1).

Table C.1. Sensitivity Analysis 1.1: Synthetic Comparison Group Weights

	Age 27				Age 45				Age 64			
State	**LCB**	**LCS**	**SLCS**	**LCG**	**LCB**	**LCS**	**SLCS**	**LCG**	**LCB**	**LCS**	**SLCS**	**LCG**
Alabama	0.070	0.154	0.143	0.080	0.071	0.156	0.142	0.081	0.071	0.157	0.143	0.083
Arkansas	0.001	0.001	0.001	0.008	0.001	0.000	0.002	0.008	0.001	0.001	0.002	0.007
California	0.001	0.001	0.001	0.008	0.001	0.000	0.002	0.008	0.001	0.001	0.002	0.007
Connecticut	0.001	0.001	0.001	0.008	0.001	0.000	0.002	0.008	0.001	0.001	0.002	0.007
Florida	0.001	0.001	0.001	0.027	0.001	0.000	0.002	0.027	0.001	0.001	0.002	0.026
Iowa	0.001	0.001	0.001	0.077	0.001	0.000	0.002	0.079	0.001	0.001	0.002	0.081
Idaho	0.001	0.022	0.053	0.055	0.001	0.025	0.054	0.055	0.001	0.028	0.055	0.056
Kansas	0.101	0.112	0.068	0.046	0.101	0.113	0.069	0.046	0.102	0.115	0.070	0.046
Kentucky	0.001	0.001	0.001	0.014	0.001	0.000	0.002	0.014	0.001	0.001	0.002	0.013
Louisiana	0.047	0.027	0.033	0.055	0.048	0.028	0.034	0.055	0.048	0.032	0.035	0.055
Michigan	0.001	0.001	0.001	0.008	0.001	0.000	0.002	0.008	0.001	0.001	0.002	0.007
Missouri	0.001	0.001	0.013	0.049	0.001	0.001	0.015	0.050	0.001	0.005	0.016	0.050
North Carolina	0.219	0.175	0.161	0.099	0.218	0.175	0.162	0.100	0.219	0.176	0.162	0.103
Nebraska	0.161	0.114	0.105	0.090	0.162	0.115	0.107	0.091	0.161	0.117	0.108	0.093
Nevada	0.001	0.001	0.001	0.023	0.001	0.000	0.002	0.023	0.001	0.001	0.002	0.022
New York	0.001	0.001	0.021	0.010	0.001	0.000	0.022	0.010	0.001	0.001	0.023	0.011
Ohio	0.001	0.001	0.001	0.008	0.001	0.000	0.002	0.008	0.001	0.001	0.002	0.007
South Carolina	0.044	0.039	0.037	0.041	0.044	0.040	0.037	0.041	0.043	0.044	0.039	0.042
South Dakota	0.112	0.112	0.127	0.073	0.112	0.113	0.127	0.075	0.112	0.114	0.128	0.076
Tennessee	**0.236**	**0.199**	**0.194**	**0.117**	**0.236**	**0.200**	**0.194**	**0.118**	**0.235**	**0.200**	**0.194**	**0.122**
Utah	0.001	0.040	0.028	0.065	0.001	0.027	0.019	0.060	0.001	0.004	0.006	0.047
Virginia	0.001	0.001	0.001	0.019	0.001	0.000	0.002	0.018	0.001	0.001	0.002	0.019
Washington	0.001	0.001	0.001	0.008	0.001	0.000	0.002	0.008	0.001	0.001	0.002	0.007
Wyoming	0.001	0.001	0.001	0.013	0.001	0.000	0.002	0.012	0.001	0.001	0.002	0.012

NOTE: The state receiving the largest weight is indicated in bold.

Table C.2. Sensitivity Analysis 1.1: Estimated Effect on Individual Marketplace Plan Premiums in Minnesota Relative to Synthetic Comparison States Following Waiver Implementation, by Plan, Age, and Year

	LCB		LCS		SLCS		LCG	
	Effect (%)	p-value	Effect (%)	p-value	Effect (%)	p- value	Effect (%)	p-value
Age 27								
2018	–$732	0.08*	–$1,579	0.08*	–$1,687	0.09*	–$1,337	0.08*
2019	–$791	0.07*	–$1,947	0.05*	–$1,992	0.07*	–$1,837	0.02*
2020	–$763	0.07*	–$1,859	0.06*	–$1,709	0.09*	–$1,571	0.05*
Overall	–$762 (–22%)	0.06*	–$1,795 (–36%)	0.01*	–$1,796 (–35%)	0.06*	–$1,582 (–29%)	0.01*
Age 45								
2018	–$1,010	0.09*	–$2,139	0.08*	–$2,304	0.10*	–$1,823	0.08*
2019	–$1,091	0.07*	–$2,654	0.05*	–$2,729	0.07*	–$2,503	0.03*
2020	–$1,053	0.07*	–$2,540	0.06*	–$2,335	0.09*	–$2,130	0.05*
Overall	–$1,051 (–22%)	0.06*	–$2,444 (–36%)	0.02*	–$2,456 (–35%)	0.06*	–$2,152 (–29%)	0.01*
Age 64								
2018	–$2,100	0.09*	–$4,362	0.08*	–$4,735	0.10*	–$3,720	0.08*
2019	–$2,270	0.07*	–$5,448	0.05*	–$5,630	0.07*	–$5,105	0.05*
2020	–$2,190	0.08*	–$5,226	0.06*	–$4,810	0.10*	–$4,314	0.05*
Overall	–$2,187 (–22%)	0.06*	–$5,012 (–36%)	0.02*	–$5,059 (–35%)	0.06*	–$4,380 (–28%)	0.03*

SOURCE: Authors' analysis using RWJF HIX Compare.
NOTE: We considered p-values ≤0.10 to be statistically significant in this analysis (indicated by *).

Table C.3. Sensitivity Analysis 1.1: Estimated Effect on Enrollee Premium Spending in Minnesota Relative to Synthetic Comparison States Following Waiver Implementation, by Plan, Age, and Income

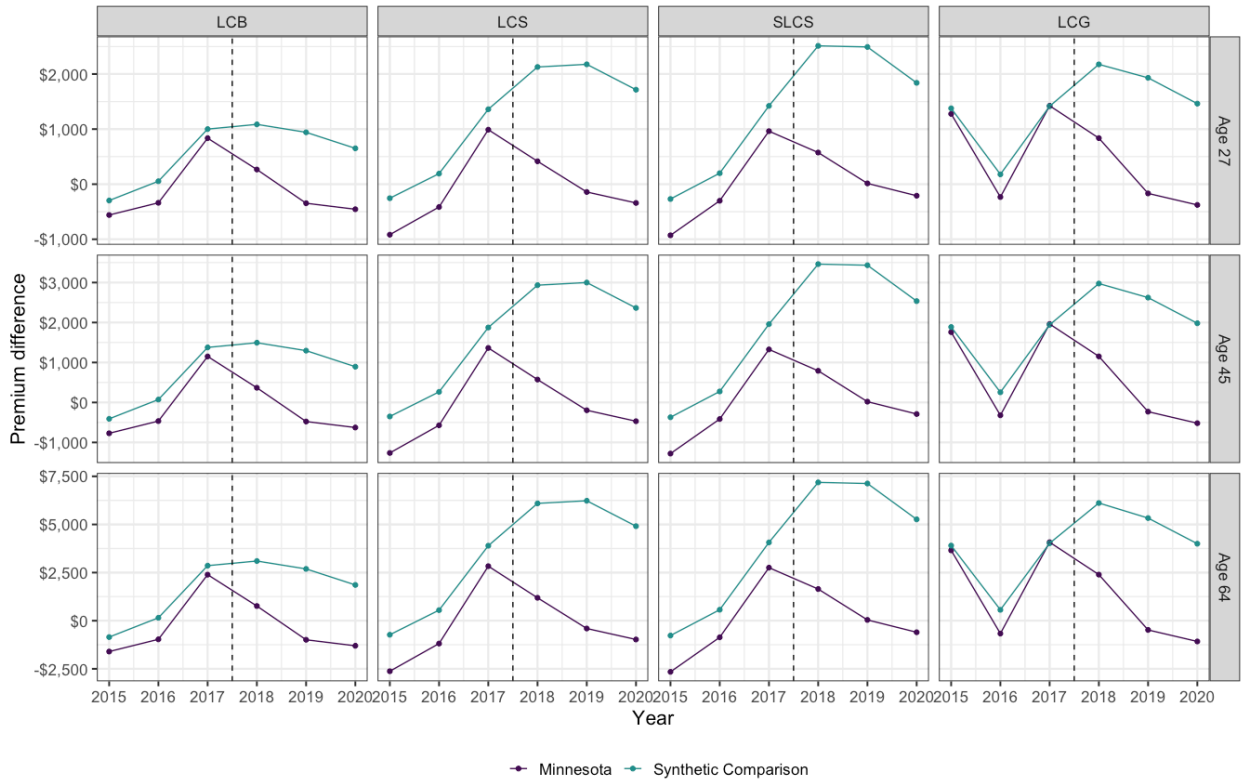
	LCB		LCS		SLCS		LCG	
	Effect	p-value	Effect	p-value	Effect	p-value	Effect	p-value
Age 27								
250% FPL	$1,034	0.01*	$1	1.00	$0	1.00	$214	0.66
350% FPL	$107	0.67	–$926	0.13	–$927	0.14	–$713	0.18
450% FPL	–$762	0.06*	–$1,795	0.01*	–$1,796	0.06*	–$1,582	0.01*
Age 45								
250% FPL	$1,405	0.01*	$12	0.96	$0	1.00	$304	0.64
350% FPL	$1,337	<0.01*	–$56	0.81	–$68	0.22	$237	0.71
450% FPL	–$1,051	0.06*	–$2,444	0.02*	–$2,456	0.06*	–$2,152	0.01*
Age 64								
250% FPL	$812	0.26	$47	0.91	$0	1.00	$679	0.60

350% FPL	$2,413	0.06*	$47	0.91	$0	1.00	$679	0.60
450% FPL	–$2,187	0.06*	–$5,012	0.02*	–$5,059	0.06*	–$4,380	0.03*

SOURCE: Authors' analysis using RWJF HIX Compare.
NOTE: We considered p-values ≤0.10 to be statistically significant in this analysis (indicated by *)

Sensitivity Analysis 1.2: Triple-Difference Analysis with State Weight Penalty

Figure C.2. Sensitivity Analysis 1.2: Average Statewide Individual Marketplace Plan Premiums in Minnesota and Synthetic Comparison States, by Plan and Age, 2015–2020



SOURCE: Authors' analysis using RWJF HIX Compare.
NOTE: The synthetic comparison reflects a weighted average of the statewide premium across 24 comparison states (see Table A.1); some states may receive zero weight (see Table C.4).

Table C.4. Sensitivity Analysis 1.2: Synthetic Comparison Group Weights

	Age 27				Age 45				Age 64			
State	**LCB**	**LCS**	**SLCS**	**LCG**	**LCB**	**LCS**	**SLCS**	**LCG**	**LCB**	**LCS**	**SLCS**	**LCG**
Alabama	0.113	0.200	0.167	0.063	0.112	0.200	0.167	0.064	0.112	0.199	0.166	0.066
Arkansas	0.001	0.000	0.001	0.018	0.001	0.000	0.001	0.018	0.001	0.000	0.001	0.017
California	0.001	0.000	0.001	0.032	0.001	0.000	0.001	0.033	0.001	0.000	0.001	0.033
Connecticut	0.001	0.000	0.001	0.015	0.001	0.000	0.001	0.015	0.001	0.000	0.001	0.013
Florida	0.001	0.000	0.001	0.015	0.001	0.000	0.001	0.015	0.001	0.000	0.001	0.013
Iowa	0.019	0.001	0.001	0.084	0.019	0.002	0.001	0.087	0.018	0.001	0.001	0.091
Idaho	0.075	0.054	0.071	0.059	0.076	0.053	0.072	0.061	0.076	0.054	0.071	0.063
Kansas	0.126	0.107	0.048	0.044	0.126	0.107	0.048	0.044	0.125	0.107	0.049	0.045
Kentucky	0.001	0.000	0.001	0.024	0.001	0.000	0.001	0.023	0.001	0.000	0.001	0.024
Louisiana	0.003	0.000	0.001	0.041	0.002	0.000	0.001	0.040	0.002	0.000	0.001	0.042
Michigan	0.001	0.000	0.001	0.043	0.001	0.000	0.001	0.044	0.001	0.000	0.001	0.045
Missouri	0.001	0.000	0.001	0.043	0.001	0.000	0.001	0.044	0.001	0.000	0.001	0.046
North Carolina	0.232	**0.266**	**0.235**	0.064	0.232	**0.267**	**0.235**	0.063	0.232	**0.266**	**0.236**	0.063
Nebraska	0.060	0.086	0.128	0.063	0.060	0.086	0.128	0.063	0.060	0.087	0.127	0.066
Nevada	0.001	0.000	0.008	0.026	0.001	0.000	0.008	0.026	0.001	0.000	0.007	0.025
New York	0.001	0.000	0.001	0.034	0.001	0.000	0.001	0.033	0.001	0.000	0.001	0.032
Ohio	0.001	0.000	0.001	0.020	0.001	0.000	0.001	0.020	0.001	0.000	0.001	0.021
South Carolina	0.001	0.009	0.013	0.015	0.001	0.009	0.013	0.015	0.001	0.009	0.014	0.013
South Dakota	0.094	0.066	0.101	0.066	0.094	0.066	0.101	0.068	0.094	0.066	0.102	0.070
Tennessee	**0.271**	0.205	0.217	**0.097**	**0.271**	0.205	0.217	**0.097**	**0.271**	0.206	0.217	**0.100**
Utah	0.001	0.000	0.001	0.089	0.001	0.000	0.001	0.083	0.001	0.000	0.001	0.071
Virginia	0.001	0.000	0.001	0.019	0.001	0.000	0.001	0.018	0.001	0.000	0.001	0.015
Washington	0.001	0.000	0.001	0.026	0.001	0.000	0.001	0.026	0.001	0.000	0.001	0.028

NOTE: The state receiving the largest weight is indicated in bold.

Table C.5. Sensitivity Analysis 1.2: Estimated Effect on Individual Marketplace Plan Premiums in Minnesota Relative to Synthetic Comparison States Following Waiver Implementation, by Plan, Age, and Year

	LCB		LCS		SLCS		LCG	
	Effect (%)	**p-value**	**Effect (%)**	**p-value**	**Effect (%)**	**p-value**	**Effect (%)**	**p-value**
Age 27								
2018	–$617	0.14	–$1,341	0.11	–$1,479	0.12	–$1,299	0.14
2019	–$1,085	0.07*	–$1,947	0.02*	–$2,019	0.07*	–$2,058	0.05*
2020	–$903	0.08*	–$1,685	0.04*	–$1,591	0.11	–$1,798	0.05*
Overall	–$869 (–24%)	0.04*	–$1,658 (–35%)	0.02*	–$1,696 (–34%)	0.05*	–$1718 (–31%)	0.05*
Age 45								
2018	–$850	0.14	–$1,849	0.08*	–$2,037	0.10*	–$1,755	0.16
2019	–$1,497	0.07*	–$2,683	0.02*	–$2,781	0.07*	–$2,787	0.05*
2020	–$1,245	0.08*	–$2,322	0.04*	–$2,192	0.09*	–$2,432	0.05*
Overall	–$1,197 (–24%)	0.04*	–$2,285 (–35%)	0.02*	–$2,337 (–34%)	0.07*	–$2,325 (–30%)	0.05*
Age 64								
2018	–$1,768	0.14	–$3,843	0.09*	–$4,229	0.09*	–$3,509	0.14
2019	–$3,112	0.07*	–$5,574	0.02*	–$5,776	0.07*	–$5,601	0.05*

2020	–$2,591	0.08*	–$4,822	0.04*	–$4,553	0.09*	–$4,867	0.05*
Overall	–$2,490 (–24%)	0.04*	–$4,746 (–35%)	0.02*	–$4,853 (–34%)	0.07*	–$4,659 (–30%)	0.05*

SOURCE: Authors' analysis using RWJF HIX Compare.
NOTE: We considered p-values ≤0.10 to be statistically significant in this analysis (indicated by *).

Table C.6. Sensitivity Analysis 1.2: Estimated Effect on Enrollee Premium Spending in Minnesota Relative to Synthetic Comparison States Following Waiver Implementation, by Plan, Age, and Income

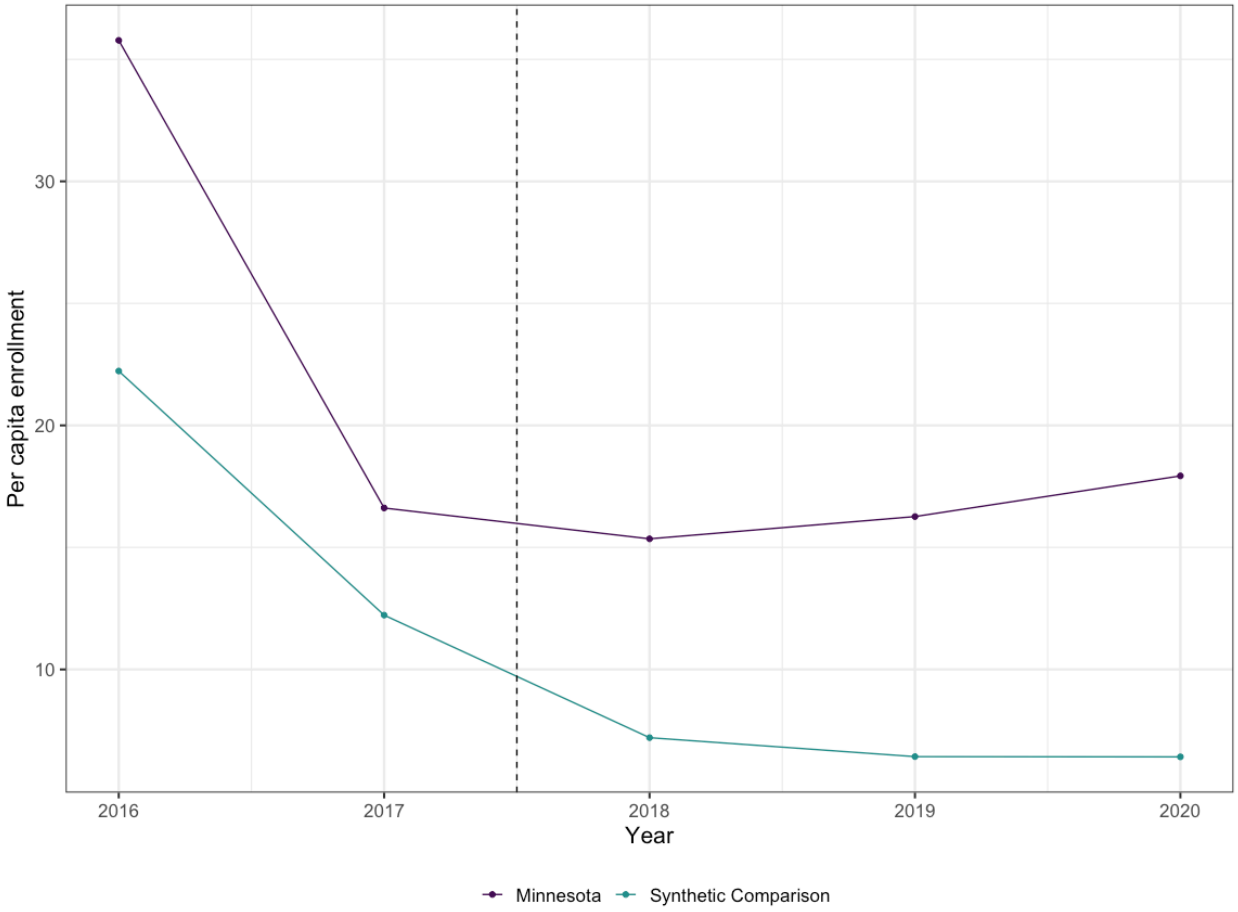
	LCB		LCS		SLCS		LCG	
	Effect	**p-value**	**Effect**	**p-value**	**Effect**	**p-value**	**Effect**	**p-value**
Age 27								
250% FPL	$828	0.01*	$38	0.80	$0	1.00	–$22	0.97
350% FPL	–$99	0.71	–$889	0.11	–$927	0.13	–$949	0.13
450% FPL	–$869	0.04*	–$1,658	0.02*	–$1,696	0.05*	–$1,718	0.05*
Age 45								
250% FPL	$1,139	0.04*	$52	0.82	$0	1.00	$12	1.00
350% FPL	$1,072	<0.01*	–$16	0.92	–$68	0.36	–$56	0.91
450% FPL	–$1,197	0.04*	–$2,285	0.02*	–$2,337	0.07*	–$2,325	0.05*
Age 64								
250% FPL	$812	0.34	$106	0.82	$0	1.00	$193	0.85
350% FPL	$2,177	0.05*	$106	0.82	$0	1.00	$193	0.85
450% FPL	–$2,490	0.04*	–$4,746	0.02*	–$4,853	0.07*	–$4,659	0.05*

SOURCE: Authors' analysis using RWJF HIX Compare.
NOTE: We considered p-values ≤0.10 to be statistically significant in this analysis (indicated by *).

Research Question 2 Sensitivity Analyses

Sensitivity Analysis 2.1: Difference-in-Differences Analysis per Capita Enrollment Specification (Unsubsidized Enrollees Only)

Figure C.3. Individual Market Enrollment per Capita in Minnesota and Synthetic Comparison States, Unsubsidized Enrollees, 2016–2020



SOURCE: Authors' analysis using CCIIO marketplace effectuated enrollment data and EDGE risk adjustment data.
NOTE: The synthetic comparison reflects a weighted average of per capita enrollment across 24 comparison states (see Table A.1); some states may receive zero weight (see Table C.7).

Table C.7. Sensitivity Analysis 2.1: Synthetic Comparison Group Weights

State	Unsubsidized
Alabama	0.000
Arkansas	0.000
California	0.000
Connecticut	0.000
Florida	0.000
Iowa	0.000
Idaho	0.000
Kansas	0.000
Kentucky	0.000
Louisiana	0.000
Michigan	0.000
Missouri	0.000
North Carolina	0.000
Nebraska	0.432
Nevada	0.000
New York	0.000
Ohio	0.000
South Carolina	0.000
South Dakota	**0.433**
Tennessee	0.135
Utah	0.000
Virginia	0.000
Washington	0.000
Wyoming	0.000

NOTE: The state receiving the largest weight is indicated in bold.

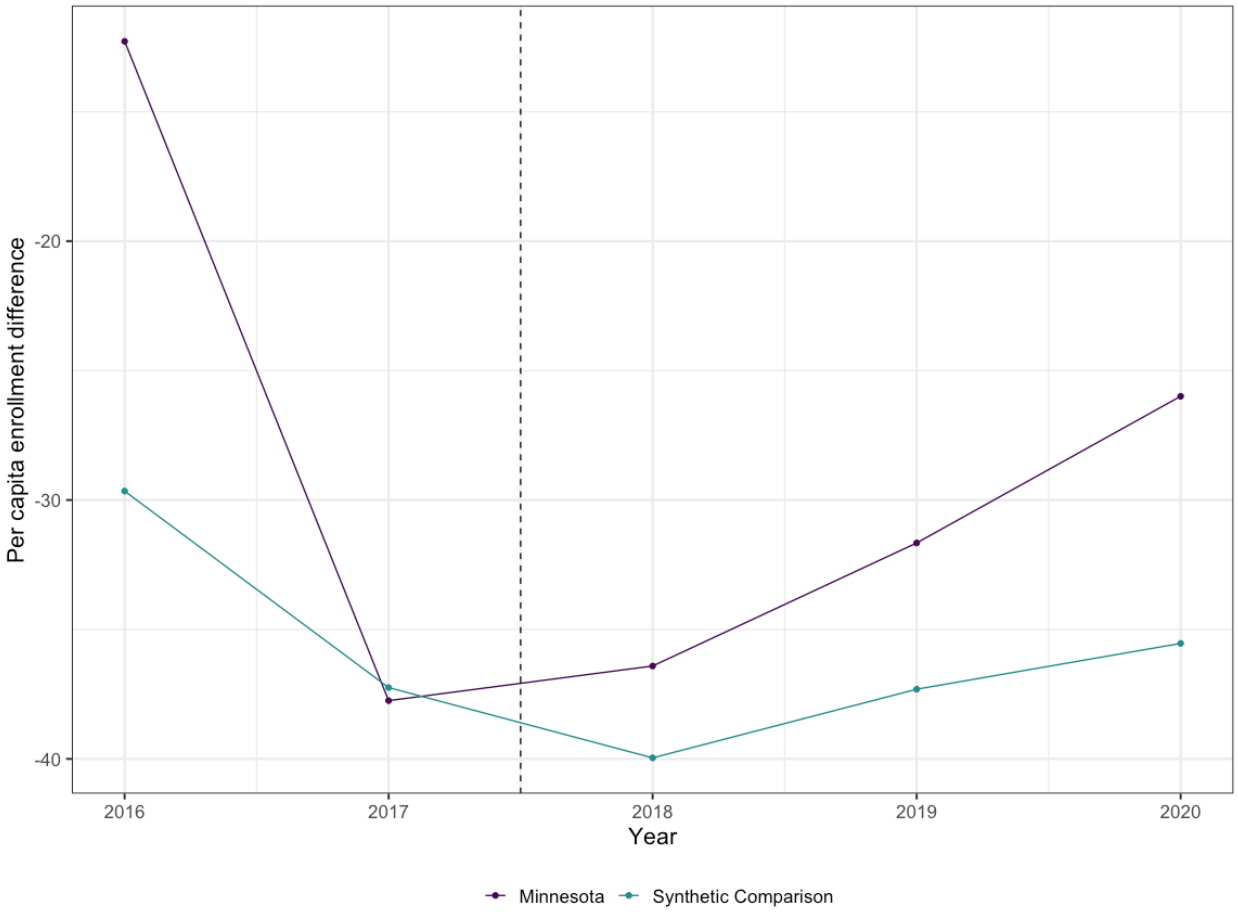
Table C.8. Sensitivity Analysis 2.1: Estimated Effect on Individual Market Enrollment in Minnesota Relative to Synthetic Comparison States Following Waiver Implementation, Unsubsidized Enrollees, 2018–2020

	Estimated Effect on Enrollment	p-value
Unsubsidized		
2018	12,036	0.53
2019	21,619	0.24
2020	31,175	0.08*
Overall	21,583	0.25

NOTE: We considered p-values ≤0.10 to be statistically significant in this analysis (indicated by *).

Sensitivity Analysis 2.2: Triple Difference Analysis with State Weight Penalty (Unsubsidized Enrollees Only)

Figure C.4. Individual Market Enrollment per Capita in Minnesota and Synthetic Comparison States, Unsubsidized Enrollees, 2016–2020



SOURCE: Authors' analysis using CCIIO marketplace effectuated enrollment data, EDGE risk adjustment data, and medical loss ratio data.
NOTE: The synthetic comparison reflects a weighted average of per capita enrollment across 24 comparison states (see Table A.1); some states may receive zero weight (see Table C.9).

Table C.9. Sensitivity Analysis 2.2: Synthetic Comparison Group Weights

State	Unsubsidized
Alabama	0.00
Arkansas	0.00
California	0.00
Connecticut	0.17
Florida	0.00
Iowa	0.17
Idaho	0.06
Kansas	0.00
Kentucky	0.00
Louisiana	0.00
Michigan	0.00
Missouri	0.00
North Carolina	0.01
Nebraska	0.27
Nevada	0.00
New York	0.00
Ohio	0.00
South Carolina	0.00
South Dakota	**0.32**
Tennessee	0.00
Utah	0.00
Virginia	0.00
Washington	0.00
Wyoming	0.00

NOTE: The state receiving the largest weight is indicated in bold.

Table C.10. Sensitivity Analysis 2.2: Estimated Effect on Individual Market Enrollment in Minnesota Relative to Synthetic Comparison States Following Waiver Implementation for Unsubsidized Enrollees, 2018–2020

	Estimated Effect on Enrollment	p-value
Unsubsidized		
2018	22,733	0.39
2019	34,712	0.19
2020	56,862	0.13
Overall	38,055	0.17

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