Pricing Regulations in Individual Health Insurance: Evidence from Medigap

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Abstract

I compare two pricing regulations that protect those with health conditions—"community rating," which requires insurers to charge uniform premiums, and "guaranteed renewal," which requires insurers to increase future premiums uniformly. Using individual-level Medigap data from 2006–2010, I compare individuals within 25 miles of borders between 3 community rating and 6 guaranteed renewal states. Relative to guaranteed renewal, community rating (with guaranteed issue) leads to a decrease in Medigap enrollment of 9.70 pp (29.7%), or 26.8–33.7% for low-spending conditions (diabetes, heart disease) and 21.9–29.9% for high-spending conditions (cancer, kidney disease); an increase in annual Medigap premiums of $276 (10.1%); a decrease in the likelihood of an earlier purchase of 7.99 pp (50.3%); and an increase in purchase delay of 1.08 years (17.0%).

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1 Introduction

Before the Affordable Care Act (ACA) was enacted in 2014, all but 5 states allowed individual health insurance to be medically underwritten (Claxton et al., 2016), which meant that insurers could evaluate health status and other risk factors to determine whether and under what terms to offer health insurance. Approximately 1 in 4 adult Americans below age 65 has a pre-existing health condition, defined as a health condition that would leave them uninsured according to pre-ACA medical underwriting practices (Fehr et al., 2018; Claxton et al., 2016, 2019). Polls show that 64–82 percent of Americans support the ACA's "pre-existing conditions" clause, which prohibits insurers from using medical underwriting (CNN Political Unit, 2010; Zengerle, 2012; Kirzinger et al., 2018). Assuring access to health insurance for people with health conditions is a popular idea, but it may lead to an adversely selected insurance pool, resulting in higher premiums for everyone (Akerlof, 1970). This unintended consequence may reduce insurance coverage for sicker people, especially if sensitivity to premiums is very high among low-income sicker people (Saltzman, 2019; Jaffe and Shepard, 2017; Finkelstein et al., 2019; Chan and Gruber, 2010) or younger and healthier people (Saltzman, 2019; Tebaldi, 2017; Ericson and Starc, 2015). Policymakers have therefore explored alternative pricing regulations also aimed at protecting those with pre-existing health conditions. This paper provides an empirical comparison of two of the leading regulatory approaches—"community rating" and "guaranteed renewal"—in the individual market for Medicare supplemental insurance.

Community rating requires insurers to charge the same premiums for all plan enrollees regardless of age, gender, health status, or other risk factors. It is often combined with guaranteed issue, which requires insurers to offer their plans to everyone. Community rating, combined with guaranteed issue, can help to ensure access to health insurance for sicker individuals. However, it may also lead to higher premiums and less coverage for younger and healthier individuals and have ambiguous effects for older and sicker individuals (Pauly, 1970; Lo Sasso and Lurie, 2009). Guaranteed renewal stipulates that an individual's future premium increase can be no larger than any other individual's future premium increase (Herring and Pauly, 2006). It can be combined with an initial open enrollment period, which is a limited time period during which insurers are required to offer their plans to everyone and are not permitted to use medical underwriting. For individuals who purchase plans during this initial open enrollment period, premiums can be raised for an entire group on the basis of rising health care costs, but premiums cannot be raised for particular individuals on the basis of health conditions or other individual factors. However, insurers can use medical underwriting for individuals who do not purchase plans during the initial open enrollment period. Guaranteed renewal, combined with initial open enrollment, can also ensure access to coverage for sicker individuals (Pauly et al., 1995).

In this paper, I compare these two regulatory regimes using unusually detailed data on Medicare supplemental insurance, also known as "Medigap," which is sold from private insurers to individuals in a highly regulated marketplace. The Medigap market is large and important, serving 14.0 million people per year in 2018 (see Figure A1), which is comparable to the size of the pre-ACA individual market (13.2 million in 2014) and the ACA marketplaces (10.6 million in 2019) (Fehr et al., 2019). I leverage a new source of restricted access administrative data from the Centers for Medicare and Medicaid Services (CMS), which contains individual-level information on supplemental insurance coverage for all Medicare beneficiaries during 2006–2010. These data, which capture the Medigap enrollment decisions of 31 million aged Medicare beneficiaries, are linked to comprehensive Medicare administrative data that include Medicare enrollment information, demographic information, geographic location, and health care claims.

I focus on a narrow segment of individuals living near a regulatory boundary and estimate impacts for subgroups of individuals with pre-existing health conditions, something that has not been possible in previous studies of the Medigap market that have relied on the Medicare Current Beneficiary Survey (MCBS) and National Health Interview Survey (NHIS) (Bundorf and Simon, 2006; Cabral and Mahoney, 2019). I implement a border discontinuity approach on a sample of individuals living within 25 miles of a regulatory boundary, who experience different pricing regulations but are otherwise similar on observable patient characteristics. I compare 3 states with community rating (and guaranteed issue)—Connecticut, Maine, and New York—and 6 comparison states with guaranteed renewal (and an initial open enrollment period)—Massachusetts, New Hampshire, New Jersey, Pennsylvania, Rhode Island,

and Vermont.

I show that in the individual market for Medicare supplemental insurance, community rating (with guaranteed issue) leads to substantial adverse selection. Compared to guaranteed renewal, community rating (with guaranteed issue) leads to a decrease in Medigap enrollment of 9.70 percentage points (29.7%) and an increase in Medigap premiums of $276 (10.1%). I find that new Medigap enrollees in community rating states are more adversely selected in terms of their Medicare uncovered costs, health conditions, and health risk scores. Much of this adverse selection is driven by differences in the timing of Medigap purchase. Community rating (with guaranteed issue) leads to a decrease in the likelihood of an earlier Medigap purchase by 7.99 percentage points (50.3%) and an increase in Medigap purchase delay by 1.08 years (17.0%).

Somewhat surprisingly, I find that the effects of community rating on Medigap enrollment are quite similar across a broad range of pre-existing conditions. For low-spending pre-existing conditions, community rating impacts range from a decrease of 9.35 percentage points (26.8%) for those with heart disease to a decrease of 10.42 percentage points (33.7%) for those with no pre-existing conditions. For high-spending pre-existing conditions, community rating impacts range from a decrease of 6.88 percentage points (21.9%) for those with lung disease to a decrease of 10.52 percentage points (29.9%) for those with cancer. Although there is some variation across pre-existing conditions, with slightly smaller impacts for those with lung disease or kidney disease, all groups are impacted similarly by community rating.

I find no evidence of substitution between Medigap and Medicare Advantage (MA), as community rating leads to a modest decrease of 1.46 percentage points (8.4%) in MA enrollment, which is not statistically significant at the 10 percent level and is of the opposite sign that would be expected if these were viewed as close substitutes. I also find no evidence of substitution among those with pre-existing conditions. Cabral and Mahoney (2019) also find no evidence of substitution between Medigap and MA, whereas Bundorf and Simon (2006) find no evidence of substitution for low-risk individuals but do find evidence of substitution for high-risk individuals.

Taken together, these findings suggest that in the Medigap market, community rating (with guaranteed issue) leads to substantial adverse selection and a corresponding decrease in Medigap enrollment. The marginal non-enrollees do not substitute into MA and end up with no supplemental insurance coverage, which exposes them to substantial financial risk. Medicare beneficiaries who rely on the Medigap market tend to have low or moderate incomes, have limited access to employer-sponsored supplemental insurance plans (Goldman and Zissimopoulos, 2003), and are more likely to live in rural areas (Lemieux et al., 2008). Many Medicare beneficiaries in community rating states may also choose not to purchase Medigap at age 65 not because of a savvy forward-looking decision but because they face such high Medigap premiums at age 65. These adverse selection pressures may therefore lead to substantial exposure to financial risk for these marginal non-enrollees.

This paper contributes to an economics literature that examines the impacts of pricing regulations, such as community rating and guaranteed renewal, on welfare costs from adverse selection and reclassification risk in long-term contracts. In early theoretical work on guaranteed renewal, Pauly et al. (1995) show that guaranteed renewable contracts can be incentive compatible in competitive insurance markets, so long as premiums are "front loaded" so that individuals pay higher premiums upfront in order to be guaranteed lower premiums in later periods, which ensures that individuals who are revealed to be low risks will not drop out in later periods. Other theoretical work on long-term contracts includes Harris and Holmstrom (1982), Herring and Pauly (2006), and Cochrane (1995). Empirical work on long-term contracts and reclassification risk includes Hendel and Lizzeri (2003) and Finkelstein et al. (2005). More recently, Handel et al. (2015) simulate welfare impacts of various restrictions on insurer pricing but do not simulate guaranteed renewable contracts. This paper's main contribution is to provide clear evidence that community rating (with guaranteed issue), relative to guaranteed renewal, leads to adverse selection and delayed purchasing behavior in the context of a large and important supplemental insurance market. Because the paper leverages newly available Medicare administrative data on supplemental insurance, this study also provides the most comprehensive comparison of pricing regulations to date in the Medigap market.

This paper also contributes to an economics literature on the Medigap market, and is most closely related to Bundorf and Simon (2006) and Cabral and Mahoney (2019). Bundorf and Simon (2006) compare states with and without community rating laws in Medigap using the 1992–1999 MCBS, a nationally representative survey of approximately 12,000 Medicare beneficiaries. This paper builds on this earlier work by leveraging a much more comprehensive individual-level data set on 31 million aged Medicare beneficiaries, making it possible to focus on a narrow segment of individuals living within 25 miles of regulatory boundaries, to examine those with pre-existing health conditions, and to examine additional outcomes such as Medigap purchase delay and the probability of purchasing Medigap at various ages. The empirical strategy in this paper is closely related to that in Cabral and Mahoney (2019). Several papers explore other aspects of the Medigap market, such as market power (Starc, 2014), search costs (Maestas et al., 2009; Lin and Wildenbeest, 2020), standardization (Finkelstein, 2004), and selection (Wolfe and Goddeeris, 1991; Hurd and McGarry, 1997; Ettner, 1997; Finkelstein, 2004; Fang et al., 2008; Starc, 2014). See Section A.4 for more discussion of the related literature on Medigap. See Section A.5 for a discussion of the related literature on community rating and guaranteed renewal.

The rest of the paper proceeds as follows. Section 2 provides background information about the Medigap market and pricing regulations. Section 3 provides a description of the data used in the paper. The empirical framework is described in Section 4. Section 5 presents the results. The main findings are discussed in Section 6. Section 7 concludes.

2 Background

2.1 Cost Sharing in Traditional Medicare

Medicare provides comprehensive health insurance for those ages 65 and above in the United States. Although Medicare covers most health care spending, Medicare beneficiaries still face significant cost sharing and Traditional Medicare coverage has no out-of-pocket maximum. As a result, Medicare beneficiaries face significant tail risk. Figure 1 and Table A1 show the distribution of Medicare annual uncovered costs by pre-existing condition. Definitions of pre-existing conditions are discussed in Section 4.3. Medicare annual uncovered costs are constructed from Medicare health care claims in 2010 by summing all out-of-pocket costs for all claim types. If a Medicare beneficiary has supplemental insurance through the private Medigap market, an employer-sponsored plan, or Medicaid, then these out-of-pocket costs are partially or fully paid by that insurer. Otherwise, the Medicare beneficiary is responsible for these out-of-pocket costs, which can be quite large. Mean annual uncovered costs for each pre-existing condition are computed based on all Medicare beneficiaries who have the condition during the observation year, regardless of whether it is the first year of diagnosis or a later year of diagnosis. Medicare beneficiaries with these conditions would need to cover these costs each year if they did not have supplemental insurance. For a Medicare beneficiary with no pre-existing conditions, median out-of-pocket costs are only $366 but the 90th, 95th, and 99th percentiles are $2,094, $3,110, and $7,103, respectively. Out-of-pocket costs are potentially even larger for those with pre-existing conditions. For a Medicare beneficiary with cancer, median out-of-pocket costs are $1,209 and the 90th, 95th, and 99th percentiles are $5,753, $8,948, and $17,443, respectively. For a Medicare beneficiary with kidney disease, median out-of-pocket costs are $1,680 and the 90th, 95th, and 99th percentiles are $6,409, $9,326, and $17,488, respectively. Using data from the Health and Retirement Study (HRS) from 2002–2012, Narang and Nicholas (2017) find that Medicare beneficiaries with a new cancer diagnosis and without supplemental insurance incur mean annual out-of-pocket costs of $8,115, which corresponds to 23.7 percent of their household income; 10 percent of these beneficiaries incur out-of-pocket costs that are 63.1 percent of their household income. Additional details on Medicare's cost sharing rules are provided in Section A.6.

2.2 Medigap Market

Because Medicare beneficiaries are exposed to financial risk, many purchase private Medicare supplemental insurance plans to cover their Medicare uncovered costs. These are known as "Medigap" plans because they fill in the "gaps" in traditional Medicare coverage. Based on data from the 2016 MCBS, Cubanski et al. (2018) report that 81 percent of beneficiaries in traditional Medicare have some form of supplemental insurance, including employer-sponsored insurance (30 percent), Medicaid (22 percent), and Medigap (29 percent). The likelihood of having any supplemental insurance rises with wealth (Goldman and Zissimopoulos, 2003). Medigap policyholders tend to have low or moderate incomes and are more likely to live in rural areas (Lemieux et al., 2008). In the 2003 MCBS, 20 percent of traditional Medicare beneficiaries with incomes below $10,000 had Medigap and nearly 40 percent of traditional Medicare beneficiaries with incomes between $10,000 and $20,000 had Medigap (Lemieux et al., 2008). This market is an important source of financial stability for low-income and middle-income Americans who have limited access to employer-sponsored supplemental insurance plans and who are not eligible for Medicaid. The average Medigap premium was approximately $2,124 in 2010 (Office of the Assistant Secretary for Planning and Evaluation, 2011).

It is rare to find a setting where community rating and guaranteed renewal can be credibly compared, but Medigap offers a nearly ideal setting for this comparison. In addition to the fact that similar states have adopted different pricing regulations, this market has several convenient features. Medigap plans are relatively homogeneous, differing only in their financial benefits, since all Medicare beneficiaries have access to the same network of health care providers. Medigap plan offerings are also standardized, with insurers only allowed to offer 10 plans with defined benefit packages. Standardization of products allows consumers to more easily evaluate plan offerings, which may lead to greater price sensitivity (Schmitz and Ziebarth, 2017) and provides a choice environment more similar to that found in other post-ACA individual health insurance markets.

In 6 of the 9 guaranteed renewal and community rating states, the total market share of the top 2 insurers exceeds 75 percent. Overall, the Medigap market is dominated by a small number of large insurers. Additional details on Medigap's market structure are provided in Section A.7. Although this paper does not focus on market concentration, there is an interesting potential benefit to high market concentration in the context of guaranteed renewal. If the Medigap market is dominated by a small number of large insurers, these dominant insurers are more likely to have a stable pool of Medigap enrollees who stay in their plans for many years. This may encourage insurers to front-load premiums, as argued by Herring and Pauly (2006), and may create more stability for Medigap enrollees. On the flip side, community rating could be viewed as promoting competition among insurers since Medigap enrollees can readily switch among insurers without exposure to medical underwriting.

2.3 Medigap Pricing Regulations

Table 1 shows a timeline of regulations in the Medigap market. The Omnibus Budget Reconciliation Act of 1990 (OBRA-90) established an initial open enrollment period for Medigap plans, which takes place during the first 6 months after reaching age 65 and enrolling in Medicare Part B. During this initial open enrollment period, Medigap insurers are not permitted to use medical underwriting. All Medigap plans are "guaranteed renewable," which means that an individual's future premium increase can be no larger than any other individual's future premium increase (Herring and Pauly, 2006). Premiums can be raised for the entire group of Medicare beneficiaries within a rating class on the basis of aging or rising health care costs, but an insurer cannot raise premiums for particular Medicare beneficiaries on the basis of health conditions or other individual factors. Insurers are permitted to vary premiums on the basis of ZIP code. In this paper, I use the term "guaranteed renewal" to refer to the combination of these two regulations—guaranteed renewal and an initial open enrollment period.

From 1990 through 2009, 28 states enacted additional pricing regulations in the Medigap market. Community rating laws, which were passed in Connecticut, Maine, Massachusetts, Minnesota, New York, Vermont, and Washington, prohibit insurers from varying premiums on the basis of individual characteristics such as age, gender, or health conditions. Insurers are still permitted to vary premiums on the basis of ZIP code. Guaranteed issue laws, which were passed in Connecticut, Maine, New York, and Washington, prohibit insurers from rejecting Medicare beneficiaries seeking Medigap plans. A small set of states—Connecticut, Maine, and New York—passed both community rating and guaranteed issue laws at around the same time during the early 1990s. I exclude Washington from this group because the 9-year gap between the passage of its community rating and guaranteed issue laws makes it less comparable to states that enacted both laws together. In this paper, I use the term "community rating" to refer to the combination of these two regulations—community rating and guaranteed issue. Additional details on Medigap pricing legislation are provided in Section A.8.

Many Medicare beneficiaries purchase Medigap during the initial open enrollment period at age 65, but many purchase Medigap after this period. Figure A4 shows the percent, among those enrolled in Medigap plans, who first purchased a Medigap plan at ages 65, 66–74, or 75+. The "age 65" category only includes those who purchased Medigap plans during the initial 6-month open enrollment period after joining Medicare; those who purchased Medigap plans at age 65 after the initial 6-month open enrollment period are included in the "ages 66–74" category. This is broken out separately for community rating and guaranteed renewal states. Among Medigap enrollees in community rating states, 24.9 percent first purchased Medigap at age 65, 41.1 percent first purchased Medigap at ages 66–74, and 34.0 percent first purchased Medigap at ages 75 and above. Among Medigap enrollees in guaranteed renewal states, 27.6 percent first purchased Medigap at age 65, 43.5 percent first purchased Medigap at ages 66–74, and 28.9 percent first purchased Medigap at ages 75 and above. As is evident in Figure A4, those in community rating states tend to purchase Medigap plans at later ages.

Qualitative evidence indicates that many Medigap insurers use medical underwriting to reject applicants with pre-existing health conditions. Many Medigap insurers sell plans using brokers, or field agents. They issue underwriting guidelines to their field agents, which often contain lists of health conditions, along with instructions not to sell Medigap plans to applicants with these health conditions, which are sometimes referred to as "declinable conditions." The field agents are sometimes instructed to ask the applicant about the prescription drugs they use, and the underwriting guidelines contain lists of prescription drugs that indicate the presence of declinable conditions. Table 2 shows a list of declinable conditions that appeared in at least half of the 14 field underwriting guidelines for Medigap policies that I was able to obtain and review. These were all posted publicly and many of them were uncovered by simple Google searches, as is suggested by Hendren (2013), who found and reviewed similar underwriting guidelines for the individual health insurance market. The declinable conditions include Alzheimer's disease, cancer, multiple sclerosis, and Parkinson's disease.

2.4 Comparing Guaranteed Renewal and Community Rating Regulations

Before turning to the data and empirical framework, it can be helpful to consider how one might expect guaranteed renewal and community rating regulations to affect equilibrium premiums and equilibrium enrollment. In a guaranteed renewal state, an individual who enters Medicare at age 65 is relatively healthy but knows that with some probability she will experience a health shock at an older age. An individual who is sufficiently risk averse and forward-looking will be induced to purchase a Medigap plan in order to insure the risk of experiencing a health shock and facing medical underwriting at an older age. In contrast, the same individual in a community rating state may not be induced to purchase a Medigap plan given that it provides no extra insurance against this reclassification risk (since there is no reclassification risk in a community rating state). Thus, at least some younger individuals in guaranteed renewal states should exhibit a higher willingness-to-pay for a Medigap plan, given that it also provides insurance against reclassification risk.

One would therefore expect higher enrollment among younger individuals in guaranteed renewal states. Less healthy older individuals in guaranteed renewal states can be rejected from purchasing Medigap plans. Thus, one would expect the risk pool to be comprised of a larger share of younger individuals as well as a relatively healthier pool of older individuals, leading to lower average premiums. In community rating states, less healthy older individuals can still purchase Medigap plans. Thus, one would expect the risk pool to be comprised of a smaller share of younger individuals as well as a relatively sicker pool of older individuals, leading to higher average premiums. A formal theoretical model comparing these two regulatory regimes is outside the scope of this paper and would likely require modeling the dynamic nature of this setting, since younger individuals enter the market when they are relatively healthy and then must make decisions about whether to purchase Medigap while knowing that they may experience health shocks in the future. Nevertheless, it is reasonable to think that community rating states would tend to exhibit higher equilibrium premiums and lower equilibrium enrollment.

3 Data

3.1 Medicare Data

The paper relies mainly on Medicare administrative data, which contain enrollment and claims information for all Medicare beneficiaries from 2006–2010, including date of birth, date of death, sex, ZIP code, monthly enrollment information, and Medicaid eligibility. The data contain all health care claims for those enrolled in Parts A and B, which are used to construct Medicare uncovered costs. Additional details on data and sample restrictions are provided in Section A.1. This paper uses an indicator for Medigap enrollment based on a CMS administrative data set on supplemental insurance that has been newly collected starting in 2007. These data capture Medicare supplemental insurance for all Medicare beneficiaries. However, the CMS administrative data do not include information on enrollment in employer-sponsored plans for Medicare supplemental insurance or on the use of Health Savings Accounts (HSAs). The CMS individual-level administrative data make it possible to observe whether an individual is enrolled in a Medigap plan during a particular year. However, there is no information on the insurer, plan type (or policy "letter"), or premium. This also means that it is not possible to observe switching across Medigap insurers.

This paper is the first, to my knowledge, to leverage these data. Other studies of Medigap have relied on individual-level Medigap indicators from the MCBS or the NHIS (Bundorf and Simon, 2006; Cabral and Mahoney, 2019) or state-level counts of Medigap enrollment from the National Association of Insurance Commissioners (NAIC) (Office of the Assistant Secretary for Planning and Evaluation, 2011). The individual-level Medigap indicator from the MCBS is available for only approximately 16,000 Medicare beneficiaries per year. In contrast, the indicator for Medigap enrollment used in this paper is available for 31 million aged Medicare beneficiaries during 2006–2010. This makes it possible to execute the empirical strategy, a border discontinuity design focusing on Medicare beneficiaries who live within 25 miles of the regulatory boundary between community rating and guaranteed renewal states.

Because these data on Medigap enrollment have not previously been used, I compare them to the measure in the MCBS. To do this, I obtained a crosswalk from individual-level identifiers in the Medicare administrative data to individual-level identifiers in the

MCBS. For Medicare beneficiaries who are in the MCBS survey, I construct a Medigap enrollment indicator based on the MCBS survey as well as a Medigap enrollment indicator based on the CMS data. Table A4 reports the results from this comparison. The mean of the MCBS Medigap enrollment indicator is 20.4 for 2007-2010. The mean of the CMS Medigap enrollment indicator is 18.9 for 2007-2010. There are several possible reasons for the slight difference between the two indicators. Some MCBS survey respondents may incorrectly report having Medigap insurance due to a lack of knowledge about the Medicare program (Bann et al., 2003) or the CMS data may not capture all Medicare beneficiaries who are enrolled in Medigap. For 2007–2010, the two measures coincide for 84.6 percent of the MCBS survey respondents and the correlation between the two measures is 0.70. The means of the two indicators follow slightly different time paths for unclear reasons, but the extent to which the two indicators coincide is quite similar across years. Although there are slight discrepancies, the two measures coincide for the vast majority of Medicare beneficiaries.

3.2 Additional Data Sources

As discussed above in Section 3.1, the CMS administrative data make it possible to observe Medigap enrollment but do not include additional detailed information on the insurer, plan type, or premium. However, two additional data sources are used to study Medigap premiums, plan offerings, and market structure. First, the paper uses proprietary data from Weiss Ratings on Medigap premiums from 1997–2013. These data report premiums by insurer, year, ZIP code, plan letter, and age. This makes it possible to construct the full menu of Medigap plan offerings for each market (ZIP code and year combination). These data are used to examine Medigap premiums as well as various measures of insurer participation. Second, the paper uses NAIC data based on annual reports from 2004–2014 on Medical Loss Ratios (MLRs) for the Medigap market, which contain the number of covered lives for the top 10 Medigap insurers in each state. These data are used to construct state-level insurer market shares for 2006–2010. In addition, the American Community Survey (ACS) from 2011 is used to create ZIP-code-level measures of demographic characteristics for households where the head of the household is at least 65 years old. See Appendix Section A.2 for additional details.

4 Empirical Framework

4.1 Border Discontinuity

The main empirical strategy uses a border discontinuity, sometimes called a geographic regression discontinuity, comparing individuals living in close geographic proximity to one another but on different sides of the Medigap regulatory boundary. I estimate the following linear regression model:

$$y_{isbt} = \beta X_{it} + \gamma \text{Community Rating}_s + \delta_t + \phi_b + \epsilon_{isbt} \quad (1)$$

where y_{isbt} denotes an outcome for individual i in state s in border segment b in year t, X_{it} denotes individual-year-level covariates, including sex, age bin indicators, and pre-existing condition indicators, δ_t denotes a year fixed effect, and ϵ_{isbt} is an idiosyncratic error term. This equation is estimated for the main analysis sample, which is aged Medicare beneficiaries in 2006–2010 living within 25 miles of the regulatory boundary between community rating and guaranteed renewal states, excluding Medicaid-eligible beneficiaries and New York City residents. The variable Community Rating_s is an indicator for living in a community rating state. The main coefficient of interest is γ, which is an estimate of the impact of community rating, relative to guaranteed renewal. The states included in this sample are shown in Figure 2. The ZIP codes located within 25 miles of the regulatory boundary are also shown in Figure 2. The main outcomes of interest are Medigap enrollment, Medigap purchase by age 65, Medigap purchase by age 75, Medigap purchase delay, and MA enrollment. The main estimating equation includes border segment fixed effects ϕ_b so that individuals are compared only to those living in close geographic proximity but on the opposite side of the regulatory boundary. The regulatory boundary is divided into border segments of approximate length 25 miles. Figure A5 shows border segments that lie along the border between Pennsylvania and New York. Further details about defining border segments are provided in Section A.3.

Instead of including border segment fixed effects in the main specification, it would also be reasonable to include Hospital Service Area (HSA) fixed effects. Since HSAs designate local health care markets for hospital care, including HSA fixed effects would compare individuals who live within the same health care market and receive most of their health care from the same providers. This is the logic used by Cabral and Mahoney (2019), who include HSA fixed effects in their preferred specification. Since Hospital Referral Regions (HRRs) designate regional health care markets for tertiary medical care, a similar argument could be made for comparing individuals who live within the same HRR. While each of these alternatives is quite reasonable, border segment fixed effects are slightly better suited for this empirical strategy, as it relies on comparing individuals who live in adjacent community rating and guaranteed renewal states. In a model that includes fixed effects for a geographic area, individuals in the geographic area will contribute variation that identifies the community rating coefficient only if the geographic area contains individuals in both community rating and guaranteed renewal states. For individuals within 25 miles of the regulatory boundary, the share who contribute identifying variation for the community rating coefficient is 29.3 percent for border segment fixed effects, 24.4 percent for HRR fixed effects, and only 3.8 percent for HSA fixed effects. This implies that the vast majority of HSAs happen to be defined such that they do not include the border areas between community rating and guaranteed renewal states. In contrast, the border segments contain many of these border areas (by construction). It appears that HRRs also contain many of these border areas, though border segments have the advantage of being slightly more granular. In any case, Panel C of Table A22 shows estimated impacts of community rating for alternative fixed effects models, including using HSAs or HRRs, and the results are quite similar.

An alternative empirical strategy is to use a regression discontinuity estimating equation that estimates the "jump" in the outcome of interest while controlling flexibly for the distance from the community rating side of the border. I also estimate the following linear regression model:

$$y_{isbt} = \beta X_{it} + \gamma \text{Community Rating}_s + f(\text{Distance to Boundary})_{it} + \delta_t + \phi_b + \epsilon_{isbt} \qquad (2)$$

where $f(\text{Distance to Boundary})_{it}$ is a flexible polynomial function of Distance to Boundary_{it}, the distance to the community rating side of the border, which takes on negative values for individuals in the guaranteed renewal states and positive values for individuals in the community rating states. The coefficient γ is an estimate of the "jump" (or "drop") in the outcome variable when crossing from the guaranteed renewal to the community rating side of the regulatory boundary.

4.2 Limitations

The empirical strategy discussed above has several important limitations. Because the community rating regulation varies at the state level, the estimated impact of community rating may be biased if the community rating indicator is correlated with unobserved characteristics that also affect Medigap enrollment. These could include various state-level factors that differ systematically for the community rating and guaranteed renewal states in the analysis. For as many observable characteristics as possible, I test for balance between community rating and guaranteed renewal states. These tests are discussed in more depth in Sections 4.6 and 4.7. However, some characteristics remain that could plausibly affect Medigap enrollment but cannot be directly observed. For example, one potential source of bias is take-up of employer-sponsored plans for Medicare supplemental insurance, which are a direct substitute for Medigap. Unfortunately, these employer-sponsored plans are not included in the CMS administrative data on supplemental insurance, so it is not possible to directly test for balance in the prevalence of these plans. To my knowledge, there are no state-level data available that would allow for a comparison of their prevalence in community rating and guaranteed renewal states. There is no specific reason to think these plans differ discontinuously across the regulatory boundary, but this cannot be ruled out. On the other hand, the two sets of states do appear relatively balanced for the observed characteristics that are discussed in Sections 4.6 and 4.7.

4.3 Pre-Existing Conditions

Pre-existing conditions are defined using individual-level data on chronic conditions. There are 12 pre-existing condition categories, which are, in ascending order of average Medicare uncovered costs: none, diabetes, other, heart, psychiatric, vascular, musculoskeletal, cerebrovascular, lung, neurological, cancer, and kidney. Details on the definition of pre-existing conditions are provided in Section A.9. Table A1 shows the distribution of Medicare uncovered costs by pre-existing condition. Those in the "none" pre-existing condition category have mean Medicare uncovered costs of $845 per year, a mean risk score of 0.457, mean Medicare costs of $5,062 per year, and an annual mortality rate of 1.465 percent. Those in the "diabetes" pre-existing condition category are also relatively low cost, with mean Medicare uncovered costs of $1,184 per year, a mean risk score of 0.711, mean Medicare costs of $7,499 per year, and an annual mortality rate of 1.731 percent. In contrast, those in the "cancer" pre-existing condition category have mean Medicare uncovered costs of $2,443 per year, 99th percentile Medicare uncovered costs of $17,443 per year, and an annual mortality rate of 7.657 percent. Finally, those in the "kidney" pre-existing condition category have mean Medicare uncovered costs of $2,823 per year, 99th percentile Medicare uncovered costs of $17,488 per year, and an annual mortality rate of 13.080 percent.

4.4 Sample Definition

Table 3 shows summary statistics for several different samples. Column 1 shows all aged Medicare beneficiaries during the study period of 2006–2010, including all 50 states and the District of Columbia. There are 119.8 million observations and 31.1 million unique individuals. In this sample, 56.8 percent of individuals are female, 10.4 percent are ages 65–66, 39.0 percent are ages 67–74, 50.6 percent are ages 75 and above, and 53.8 percent have a health condition. There are 7.6 percent of individuals who live in a community rating state. An individual's average distance to a state border is 72.8 miles and 32.1 percent of people live within 25 miles of a state border. The annual mortality rate is 3.9 percent and average Medicare uncovered costs are $1,423 per year. About 24.7 percent of individuals are enrolled in Medigap and 25.4 percent are enrolled in MA.

Column 2 restricts the sample to individuals living in community rating states and bordering guaranteed renewal states, which consists of 22.9 million observations and 5.9 million unique individuals. This sample is very similar to that in column 1 on demographic and health characteristics. These individuals are slightly older, with 54.7 percent ages 75 and above, and slightly sicker, with 54.7 percent having a health condition and an annual mortality rate of 4.0 percent. They also have slightly higher average Medicare uncovered costs of $1,519 per year. They are similarly likely to be enrolled in Medigap, at 24.9 percent, and are slightly more likely to be enrolled in MA, at 28.5 percent.

Column 3 further restricts the sample to individuals in boundary ZIP codes. These are ZIP codes that lie along the regulatory boundary between community rating and guaranteed renewal states. A ZIP code in a community rating state is defined to be a boundary ZIP code if its nearest bordering state is a guaranteed renewal state. Boundary ZIP codes in guaranteed renewal states are defined analogously. There are approximately 9.4 million observations and 2.4 million unique individuals in the boundary ZIP codes sample. These individuals are similar to the sample in column 2 on demographic and health characteristics. They are, by construction, more likely to be located in a community rating state. This sample is slightly less urban, with 83.6 percent located in urban ZIP codes. These individuals are slightly less likely to be enrolled in Medigap, at 22.0 percent, and are slightly less likely to be enrolled in MA, at 27.6 percent.

Finally, column 4 further restricts the sample to individuals living within 25 miles of the regulatory boundary. This sample, which is the main analysis sample used for the main results, consists of 3.4 million observations and 0.9 million unique individuals. The sample is quite similar to the sample in column 1 on demographic and health characteristics. Individuals in this sample live 13.8 miles from a state border on average. New York City is also excluded from this sample, as individuals on either side of the state borders in this large metropolitan area are much less comparable to one another. Medicaid-eligible beneficiaries are also excluded from this sample, as they generally do not purchase Medigap because Medicaid usually covers Medicare uncovered costs. This sample restriction is discussed more in Section 4.6. Individuals in this sample are more likely to be enrolled in Medigap, at 28.7 percent, and less likely to be enrolled in MA, at 17.4 percent.

Table 3 also shows the percent of individuals with pre-existing conditions. In the sample of all aged Medicare beneficiaries shown in column 1, about 46.2 percent of Medicare beneficiaries have no pre-existing conditions, which means that 53.8 percent have at least 1 pre-existing condition. The most common pre-existing conditions are cancer (10.4 percent), heart disease (7.4 percent), diabetes (7.1 percent), and lung disease (6.8 percent). For the main analysis sample shown in column 4, about 43.6 percent have no pre-existing conditions.

The rates for the most common pre-existing conditions are similar to those in column 1: 11.9 percent have cancer, 7.8 percent have heart disease, 6.9 percent have diabetes, and 7.2 percent have lung disease. These summary statistics indicate that the main analysis sample is representative of the entire population of aged Medicare beneficiaries.

4.5 Summary Statistics

Table A7 presents more detailed summary statistics for the main analysis sample, which is aged Medicare beneficiaries in 2006–2010 living within 25 miles of the regulatory boundary between community rating and guaranteed renewal states, excluding Medicaid-eligible beneficiaries and New York City residents. This corresponds to column 4 of Table 3. For this sample, 57.5 percent are female, 9.4 percent are ages 65–66, 36.5 percent are ages 67–74, and 54.1 percent are ages 75 and above. For Medicare uncovered costs, the mean is $1,486 per year, the median is $662 per year, the 90th percentile is $3,546 per year, and the 99th percentile is $11,922 per year. About 82.1 percent of individuals in this sample live in an urban ZIP code. The mean number of health conditions is 1.3, with a 90th percentile of 4.0 and a 99th percentile of 8.0. The mean risk score is 1.0, with a 90th percentile of 2.0 and a 99th percentile of 4.5. Additional summary statistics are shown in Table A8.

Figure A6 shows mean annual Medigap premiums in guaranteed renewal and community rating states. In guaranteed renewal states, these range from $2,604 in Vermont to $3,819 in New Jersey. In community rating states, these range from $3,356 in Maine to $4,286 in New York. In this figure, Medigap premiums appear to be higher in at least two of the community rating states (Connecticut and New York), though this simple comparison does not adequately control for geographic variation in costs across the different states. The difference in premiums is revisited in Section 5.1 using the empirical specification in Equation 1, which includes border segment fixed effects.

4.6 Balance on Predetermined Observable Characteristics

Table 4 shows statistical tests for balance on predetermined observable characteristics. The table reports tests for balance for demographic variables for older adults ages 65 and above based on the ACS in 2011. These characteristics, which are defined at the ZIP code level, are: median household income, percent with less than a high school education, percent with a high school graduate education, percent with a college graduate education, poverty rate, veteran rate, labor force participation rate, and homeownership rate. The table reports estimates from a series of linear regressions that are similar to Equation 1:

$$y_{isbt} = \gamma \text{Community Rating}_s + \delta_t + \phi_b + \epsilon_{isbt} \tag{3}$$

where the dependent variable y_{isbt} is one of the characteristics from the ACS, such as median household income. All specifications include year fixed effects δ_t and border segment fixed effects ϕ_b. Each entry in the table reports the coefficient on the Community Rating$_s$ indicator, which provides a test for whether there is imbalance between community rating and guaranteed renewal states. The table also reports results from an F-test of joint significance for all the variables listed in the table. The four columns in this table correspond to the samples reported in Table 3.

In column 1, which reports results for the entire sample of aged Medicare beneficiaries, differences between community rating and guaranteed renewal states are statistically significant at the 1 percent level for percent with less than a high school education, percent with a high school graduate education, poverty rate, veteran rate, and homeownership rate. The p-value for the joint F-test is less than 0.001. This reflects the fact that for the Medicare population as a whole, individuals living in community rating states are quite different from individuals living in guaranteed renewal states. In columns 2 and 3, there are also statistically significant differences between individuals in community rating and guaranteed renewal states on several characteristics, and the p-value for the joint F-test is also less than 0.001. However, in column 4, which corresponds to the main analysis sample of individuals living within 25 miles of the regulatory boundary, individuals in community rating states and guaranteed renewal states are much more similar. Differences on the predetermined observable characteristics are much smaller and are not statistically significant at the 10 percent level. The p-value for the joint F-test is 0.7680. This main analysis sample is relatively balanced on these observable characteristics.

One potential confounder is differences in Medicaid eligibility across state borders. In order to assess whether this is an important concern for the community rating and guaranteed renewal states used in the analysis, I compiled Medicaid eligibility requirements for older adults ages 65 and above (Musumeci et al., 2019), which are shown in Table A9. The states are listed in order from most restrictive eligibility requirements to least restrictive eligibility requirements. Medicaid eligibility requirements for older adults ages 65 and above tend to be more uniform than for those under age 65, since most states base them off of eligibility requirements for Supplemental Security Income (SSI). Vermont, which is a guaranteed renewal state, sets its income and asset limits exactly at the levels required for SSI eligibility, which is an income of up to 74 percent of the Federal Poverty Level (FPL), an asset limit of $2,000 for an individual and $3,000 for a couple, and a monthly income disregard of $20. Most other states have identical or very similar asset limits, with slight variations in income eligibility, as several states have a higher threshold of 100 percent of the FPL. Nevertheless, there is no systematic relationship between Medicaid eligibility requirements and Medigap pricing regulations, as both community rating and guaranteed renewal states span the range from slightly more to slightly less restrictive requirements. Although this is not definitive, this is a reassuring indication that cross-state differences in Medicaid eligibility are unlikely to be an important confounder. More direct statistical tests are discussed in Section 4.7.

4.7 Balance on Observable Health Characteristics, Provider Market Characteristics, and Consumer Characteristics

Three additional tables show statistical tests for balance on additional characteristics that may vary between community rating and guaranteed renewal states. Table A10 shows tests for balance on observable health characteristics, which include an indicator for each pre-existing condition as well as other proxies for predicted health risk. One should note that this comparison is imperfect, as the measured prevalence of these health conditions depends on diagnoses reported in the claims data and do not necessarily fully reflect underlying health. Nevertheless, it is still informative to examine whether the two populations are relatively similar. The populations in community rating and guaranteed renewal states look quite similar across the 12 pre-existing condition categories, although there are some differences. For instance, differences are statistically significant and prevalence is more than 10 percent higher in community rating states for the diabetes, heart, psychiatric, and lung pre-existing condition categories. The probability of having no pre-existing condition is also about 6.7 percent lower in community rating states, which is marginally statistically significant. Otherwise, the two sets of states are quite similar across the remaining categories. Table A10 also shows tests for balance on various predictors of underlying health risk, including out-of-pocket spending, total spending, risk score (based on the MA risk adjustment model), mortality rate, number of health conditions, and indicators for 10-year age bins. None of these differences is statistically significant and the differences are all quite small in magnitude, ranging from -0.9 percent to 5.8 percent. This comparison strongly suggests that underlying health risk, while not identical across the two sets of states, is at least broadly similar.

Table A11 shows tests for balance on provider market characteristics. Specifically, the table examines whether differences in provider costs might contribute to differences in insurer costs between community rating and guaranteed renewal states. Because Medigap insurers reimburse providers at Medicare rates, there should be less variation in provider payment rates compared to in the commercial market. However, provider payment rates are still adjusted on the basis of geographically varying factors such as the Medicare Wage Index and the Medicare Geographic Adjustment Factor. These two factors are compared for the baseline specification as well as for several others—those that limit the sample to beneficiaries living within 10 miles or 5 miles of the border, and those that include HSA or HRR fixed effects instead of border segment fixed effects. This comparison shows that these Medicare adjustment factors are very similar in community rating and guaranteed renewal states, with differences of less than 1 percent in magnitude in the baseline specification.

Table A12 shows tests for balance on several consumer characteristics: household income (based on ZIP code), a female indicator, age, and Medicaid eligibility. For the baseline specification, the differences in household income, the female indicator, and age are quite small and less than 3 percent in magnitude. For the Medicaid eligibility balance test, the sample includes Medicare beneficiaries who are eligible for Medicaid. In the baseline specification, approximately 7.2 percent of Medicare beneficiaries in guaranteed renewal states are eligible for Medicaid. Note that this is substantially lower than in the overall Medicare population, in part because the sample has been restricted to those ages 65 and over. In community rating states, the probability of Medicaid eligibility is only 0.3 percentage points higher, or 4.3 percent higher than in guaranteed renewal states. The difference is not statistically significant. There are some slightly larger differences for the other specifications, though none is statistically significant. Given that the prevalence of Medicaid eligibility is so similar in both sets of states, and that Medicaid enrollees have very low levels of Medigap enrollment (since their cost sharing requirements are often covered by Medicaid), it seems reasonable to exclude those eligible for Medicaid from the main analysis sample as they would contribute little identifying variation. In any case, the results from these balance tests indicate that excluding those eligible for Medicaid should not substantially affect the main results. Indeed, estimated impacts on Medigap enrollment are very similar even when this group is included in the sample, which is shown as a robustness check in Table A22.

5 Results

5.1 Impacts of Community Rating on Adverse Selection

The first set of results examines how community rating affects adverse selection into Medigap enrollment using several measures—Medigap enrollment, Medigap premiums, and a test of differential selection into Medigap enrollment.

Table 5 shows that community rating leads to a substantial decrease in Medigap enrollment. The estimated decrease ranges from 9.81 percentage points in column 1, which does not include any control variables, to 9.70 percentage points (29.7%) in the preferred specification in column 4, which includes a female indicator, year fixed effects, age bin indicators, and an exhaustive set of indicators for pre-existing conditions. Each of these estimates is statistically significant at the 1 percent level. Figure 3 shows the estimated impact of community rating from Equation 2. The figure also plots the mean level of Medigap enrollment for Medicare beneficiaries at various distances from either side of the border. In this figure, it is relatively clear that Medigap enrollment is substantially higher on the guaranteed renewal side of the border. Medigap enrollment also appears to be similarly higher at a distance of 25 miles or 5 miles, with no strong relationship between distance and Medigap enrollment. The figure plots the predicted values from a cubic polynomial in distance, which is included as a control in the linear regression model. Using this empirical strategy, the estimated drop in Medigap enrollment is 11.7 percentage points, which is slightly larger in magnitude but similar to the estimate obtained by simply comparing the border populations.

Figure 5 shows impacts of community rating on Medigap premiums, for the overall sample as well as within various age bins. The figure is based on Weiss Ratings data from 2006–2010 on annual premiums for each combination of ZIP code, year, insurer, sex, and age. Within each combination of ZIP code, year, insurer, sex, and age, the premium is constructed as a simple average of the premiums offered for plan A (the least generous plan) and plan F (the most generous plan) for ease of interpretability (for the 88% of observations for which both plans are offered). The specification includes sex, age, year, and border segment fixed effects, and each observation is weighted by the population of Medicare beneficiaries in the ZIP code, year, sex, and age combination. Insurer fixed effects are not included in the specification because there are very few insurers that are well represented in both community rating and guaranteed renewal states. Several states have dominant insurers that are not present at all in other states. Although there are a few national insurers, such as United Health and Mutual of Omaha, that are well represented in all states, including insurer fixed effects would limit the identifying variation to these insurers, which is not representative of all premiums being offered in these states. Instead, the sample is limited to insurers with at least a 1% state-year-level market share to limit the influence of premiums offered by very small insurers, since consumers may perceive these insurers as unreliable or unstable. The figure shows that community rating leads to an overall increase of $276 (10.1%) in Medigap premiums, consistent with a slightly more adversely selected pool of Medigap enrollees. These effects are especially pronounced among younger buyers. Premiums increase $765 (35.0%) for 65-69-year-olds, $454 (17.8%) for 70-74-year-olds, and $163 (5.7%) for 75-79-year-olds, but show decreases ranging from 0.9% to 2.7% for those ages 75 and older.

To put the economic significance of these premium increases in context, it is helpful to consider the relationship between Medigap premiums and insurer competition or age within guaranteed renewal states. For a Medigap market (ZIP code and year combination) within one of the comparison guaranteed renewal states, having 1 additional insurer that offers plans A and F is associated with Medigap premiums that are $62 lower. Thus, the premium increase of $276 associated with community rating is equivalent to having approximately 4.5 fewer insurers offering plans A and F, which is a 43.7 percent drop compared to the baseline mean of 10.3 insurers. One can also examine how insurers vary their pricing across ages within guaranteed renewal states by estimating a linear relationship between age and Medigap premium and including insurer fixed effects and year fixed effects. I estimate that each additional year in age is associated with a $58 increase in the premium. Thus, the overall increase of $276 associated with community rating is equivalent to an increase in age of 4.8 years.

It is also interesting to consider the implied price elasticity of demand for Medigap insurance if Medicare beneficiaries were only responsive to Medigap premiums and not to other aspects of the community rating regulation. Since community rating leads to a 9.70 percentage point (29.7%) drop in Medigap enrollment and $276 (10.1%) increase in Medigap premiums, a back-of-the-envelope calculation suggests a price elasticity of demand of approximately 2.94. This is substantially higher than the estimated price elasticity of 1.13 from Starc (2014), who more formally estimates a model of consumer demand in the Medigap market that incorporates plan letter and insurer fixed effects. The back-of-the-envelope price elasticity of demand may be higher because it is not derived from a consumer demand model and because it does not account for the fact that community rating may induce some Medicare beneficiaries not to enroll in Medigap plans for reasons other than the higher premiums.

Table A19 shows tests of differential selection into Medigap enrollment for community rating and guaranteed renewal states. The columns show estimates from a specification that is in the spirit of the "positive correlation" test of selection in Fang et al. (2008), but adapted to provide a comparison between community rating and guaranteed renewal states. The outcome variables are proxies for predicted health care costs: Medicare uncovered costs, an indicator for any health condition, the number of health conditions, the risk score (based on the MA risk adjustment model), and mortality (an indicator for whether the Medicare beneficiary died during the observation year). The main independent variables of interest are an indicator for Medigap enrollment and an indicator for Medigap enrollment interacted with community rating. The coefficients on these variables provide a measure of whether Medigap enrollees are positively or negatively selected relative to the rest of the Medicare population, with a potentially differential effect for community rating states. The model also includes an indicator for community rating, border segment fixed effects, and year fixed effects. A typical "positive correlation" test would also control for all variables that insurers can use in their pricing. However, these variables differ in community rating and guaranteed renewal states, since insurers may price on age only in guaranteed renewal states. Thus, the results presented here should not be viewed strictly as a "positive correlation" test but are merely suggestive of whether there is differential selection. For three of the proxies for predicted health care costs—Medicare uncovered costs, number of health conditions, and risk score—the coefficient on Medigap × Community Rating is positive and statistically significant, which suggests that the pool of Medigap enrollees is more adversely selected in community rating states. However, these effect sizes are modest, ranging from 3.3 to 5.2 percent. The Medigap × Community Rating coefficient is also positive but not statistically significant for the other proxies for predicted health care costs. Interestingly, the Medigap coefficient is negative and statistically significant for four of the proxies for predicted health care costs, which suggests that the pool of Medigap enrollees is positively selected in guaranteed renewal states, consistent with the results from Fang et al. (2008).

These three impacts of community rating—lower Medigap enrollment, higher Medigap premiums, and a more adversely selected pool of Medigap enrollees—provide strong evidence that community rating leads to more adverse selection in the Medigap market.

5.2 Impacts of Community Rating on Medigap Purchase Delay

The next set of results examines Medigap purchase delay and shows that much of this adverse selection is driven by differences in the timing of Medigap purchase.

Panel A of Table 6 shows that community rating substantially reduces the probability of a Medigap purchase by age 65. The preferred specification in column 4, which includes all control variables, shows that community rating leads to a 7.99 percentage point (50.3%) decrease in the probability of a Medigap purchase by age 65, which is statistically significant at the 1 percent level. Results in columns 1–3, which include fewer control variables, are nearly identical.

The indicator for Medigap purchase by age 65 is equal to 1 for those who purchase Medigap at age 65 during the initial 6-month open enrollment period as well as those who purchase at age 65 after the initial 6-month open enrollment period. However, these two groups could be qualitatively different, as one might expect the former group to be more attentive to the Medigap regulations and perhaps even advantageously selected. I examine this hypothesis by redefining the outcome to be equal to 1 only for those who purchase at age 65 during the 6-month open enrollment period, and the results are nearly identical. The two groups are also very similar in terms of demographic characteristics, though this comparison is limited since health conditions are not observed until a Medicare beneficiary has been enrolled for at least 1 year (since they are constructed from the claims data). As is shown in Figure A4, large differences in Medigap enrollment arise between community rating and guaranteed renewal states during the initial 6-month open enrollment period at age 65, even though Medicare beneficiaries in both sets of states are guaranteed to be able to purchase Medigap plans at the same premiums offered to other Medicare beneficiaries. These differences are likely driven by the fact that in community rating states, Medigap premiums are much higher at age 65 and Medicare beneficiaries do not have the incentive to lock in a guaranteed renewable Medigap plan.

Community rating has smaller impacts on the probability of a Medigap purchase by age 75, shown in Panel A of Table A13. The preferred specification in column 4 shows that community rating leads to a 1.50 percentage point (11.7%) decrease in the probability of a Medigap purchase by age 75, which is not statistically significant at the 10 percent level. Community rating also leads to an increase in Medigap purchase delay, or the number of years until purchasing Medigap after enrolling in Medicare at age 65, which is only defined among those Medicare beneficiaries who have purchased Medigap. For instance, someone who purchases Medigap at age 70 would have a value of Medigap purchase delay of 5 years.

The preferred specification in column 4 of Panel B of Table 6 shows that community rating leads to an increase of 1.08 years (17.0%) in Medigap purchase delay, which is statistically significant at the 1 percent level.

Another interesting question is whether community rating might affect the probability of dropping a Medigap plan. For Medigap enrollees in guaranteed renewal states, there is a strong disincentive to drop a Medigap plan since this can mean exposure to medical underwriting. In contrast, Medigap enrollees in community rating states could drop their Medigap plans and then purchase new plans at a later time without facing medical underwriting. To explore this question, I examine lapsation among Medigap buyers, or the probability of disenrolling from Medigap (conditional on being enrolled in Medigap during the previous year and being alive through the end of the current year). One limitation of this measure is that if a Medigap enrollee drops a plan and immediately purchases a new plan within the same year, this will not be captured by this measure of lapsation. I also do not observe switches across Medigap insurers. In any case, the annual lapsation rate is only around 3.6 percent. The difference in lapsation between community rating and guaranteed renewal states is very small and not statistically significant. The lapsation rate is also similar across various ages and risk scores. Thus, although it is theoretically possible that Medicare beneficiaries in community rating states could move into and out of Medigap plans more frequently, very few appear to do so. Thus, community rating primarily affects the timing of the Medigap purchase as opposed to moves into and out of the Medigap market.

5.3 Impacts of Community Rating on MA Enrollment

Because Medigap and MA each offer additional insurance coverage beyond that provided by traditional Medicare, they can be considered partial substitutes for one another. However, they are imperfect substitutes since Medigap still allows Medicare beneficiaries to access the entire network of Medicare providers, whereas MA plans usually provide coverage only for a restricted network of providers. Because community rating leads to a large decrease in Medigap enrollment, one hypothesis is that there might be an offsetting increase in MA enrollment. Panel B of Table A13 shows estimated impacts of community rating on MA enrollment. The preferred specification in column 4 shows that community rating leads to a

1.46 percentage point (8.4%) decrease in MA enrollment, which is not statistically significant at the 10 percent level. The estimates in columns 1–3, which include fewer controls, are very similar. Thus, there is no evidence of an offsetting effect on MA enrollment, which suggests that Medicare beneficiaries do not view these products as close substitutes.

5.4 Impacts of Community Rating by Pre-Existing Condition

Given that community rating leads to substantial adverse selection in the overall Medicare population, the next set of results examines whether this varies by pre-existing condition. All else equal, one would expect those with high-spending pre-existing conditions to exhibit less sensitivity to Medigap premiums and to therefore experience smaller impacts on Medigap enrollment. Table A14 shows impacts of community rating on Medigap enrollment by pre-existing condition. Panel A shows results for low-spending pre-existing condition categories, which are none, diabetes, other, and heart. For these categories, impacts of community rating range from a decrease of 9.35 percentage points (26.8%) for heart to a decrease of 10.42 percentage points (33.7%) for none. Panel B shows results for medium-spending pre-existing condition categories, which are psychiatric, vascular, musculoskeletal, and cerebrovascular. Estimated community rating impacts range from a decrease of 9.31 percentage points (25.3%) for vascular to a decrease of 10.91 percentage points (33.5%) for cerebrovascular. Finally, Panel C shows results for high-spending pre-existing condition categories, which are lung, neurological, cancer, and kidney. A couple of these estimates are slightly smaller in magnitude, with a decrease of 6.88 percentage points (21.9%) for lung and a decrease of 7.90 percentage points (26.6%) for kidney. Overall, the estimated impacts of community rating on Medigap enrollment are remarkably similar across pre-existing conditions and are summarized in Figure 4. This is somewhat surprising but suggests that there are other unobserved characteristics affecting premium sensitivity that covary with pre-existing conditions, such as risk aversion, though this explanation cannot be directly assessed with these data.

Consistent with the previous set of results, Table A15 shows that community rating leads to large delays in Medigap purchasing for all pre-existing condition categories, especially among the high-spending pre-existing condition categories. For low-spending pre-existing condition categories, community rating leads to a decrease in Medigap purchase by age 65 ranging from 6.61 percentage points (48.1%) for heart to 9.13 percentage points (49.7%) for none. The estimated impacts are similar for medium-spending pre-existing condition categories and even larger for several high-spending pre-existing condition categories. Community rating leads to decreases in early Medigap purchasing of 7.25 percentage points (53.7%) for neurological, 8.07 percentage points (54.2%) for cancer, and 6.13 percentage points (55.7%) for kidney. These results are also summarized in Figure 4. Results in Table A16 show that community rating leads to modest decreases in the probability of Medigap purchase by age 75 across pre-existing conditions, with magnitudes ranging from 7.3% to 18.7%. As is shown in Table A17 and Figure 4, community rating leads to an increase in Medigap purchase delay that ranges from 0.99 years (16.7%) for the psychiatric pre-existing condition category to 1.56 years (19.6%) for the kidney pre-existing condition category. Community rating has a small impact on MA enrollment that is not statistically significant at the 10 percent level for any of the pre-existing condition categories. These results are shown in Table A18.

5.5 Heterogeneity in Impacts of Community Rating on Medigap Enrollment

The results so far suggest that community rating regulations lead to substantial adverse selection in the Medigap market. It can be informative to examine how these adverse selection pressures vary with other features of the economic environment. Table 7 explores heterogeneity in impacts of community rating on Medigap enrollment for various subsamples.

Panel A shows how impacts of community rating vary with Medicaid generosity. Interestingly, in states with stricter Medicaid eligibility requirements—meaning that more high-cost individuals remain in the Medigap risk pool—community rating leads to a 22.7 percentage point (51.9%) decrease in Medigap enrollment, more than double the estimated decrease in the broader set of states. In columns 2–3, the sample is split between states with low versus high Medicaid provider payment rates. Although this is less directly related to the Medigap risk pool than Medicaid eligibility requirements, Medicaid provider payment rates could be viewed as a proxy for overall Medicaid program generosity, and more generous programs may also tend to cover more high-cost individuals. Consistent with this, community rating regulations have a very small effect in states with high Medicaid provider payment rates, reducing Medigap enrollment by only 0.50 percentage points (2.8%).

Panel B shows how adverse selection pressures vary with the share of older individuals (those ages 85 and above). In areas with a high share of older individuals, community rating leads to a 16.6 percentage point (44.1%) decrease in Medigap enrollment, which is 71% larger in magnitude than the estimate of 9.70 percentage points for the baseline sample. However, effect sizes are not larger in areas with high mean risk scores or high mortality, shown in Panel C. One explanation for these findings may be due to the fact that in community rating states, insurers are not permitted to price on age but are still permitted to price on ZIP code. Thus, in the absence of a risk adjustment mechanism, the effects of community rating may depend on the variables that can be used in insurer pricing.

5.6 Impacts of Community Rating on Insurer Participation and Insurance Market Concentration

Over a longer time period, pricing regulations could affect not only consumer behavior but also insurer behavior. In Connecticut, Maine, and New York, community rating has been in place since 1994 at the latest, or at least 12 years before the study period. Thus, one question is whether community rating may have affected competition in the Medigap insurance market. Table A20 shows impacts of community rating on several measures of insurer participation and insurance market concentration. Panel A shows estimates on three measures of insurer participation: the number of insurers offering all plans (plans A through F), the number of insurers offering plans A and F (where plan A has the least coverage and plan F has the most coverage), and the number of insurers offering any plan (including plans A through F as well as other letters). These measures are constructed based on the Weiss Ratings data, which include all the Medigap premiums and plan offerings throughout the study period of 2006–2010. Observations are constructed at the market level, which corresponds to a ZIP code and year combination, with each market weighted by its number of Medicare beneficiaries. In community rating states, the mean number of insurers offering all plans is 1.538 lower, a decrease of 33.1 percent compared to the mean of 4.650 in guaranteed renewal states. Similarly, in community rating states, 6.864 fewer insurers offer plans A and F and 15.889 fewer insurers offer any plan, which are decreases of 17.623 percent and 28.382 percent compared to the mean in guaranteed renewal states, respectively.

Panel B shows impacts of community rating on insurance market concentration. There is no consistent pattern, as the market share of the top insurer is slightly lower in community rating states but the market share of the top 2 insurers or market share of the top 3 insurers is slightly higher. However, an important caveat is that these market shares, based on NAIC data, are only available at the state-year level. In any case, these results taken together strongly suggest that there is less insurer participation but a similar level of insurance market concentration in community rating states compared to guaranteed renewal states. One interpretation is that this is a direct result of the pricing regulations. However, another possibility that cannot be ruled out is that the two sets of states simply differ in their insurance market characteristics for other reasons. If so, this could contribute to differences in Medigap premiums, though it would not explain the differential impacts by age group seen in Figure 5.

5.7 Impacts of Community Rating on Medigap Enrollment, Controlling for Additional Covariates

One potential concern with the border discontinuity empirical strategy used in this paper is that the community rating indicator may be correlated with various state-level or area-level characteristics that could affect the probability of Medigap enrollment. These could include insurance market characteristics, provider characteristics, and marginal tax rates. In order to address this concern, Table A21 shows how the community rating coefficient changes when controls are included for these characteristics. Panel A shows the results from controlling for two measures of insurer participation (the number of insurers offering all plans and the number of insurers offering plans A and F) as well as insurance market concentration (the market share of the top insurer and the market share of the top 2 insurers). Across these specifications, the community rating coefficient ranges from -8.47 percentage points to

-9.99 percentage points, compared to a coefficient of -9.70 percentage points in the baseline specification. Thus, including these controls does not substantially affect the community rating coefficient.

Panel B shows results from including controls for provider characteristics as well as the marginal tax rate. The provider characteristics included as controls are the Medicare Wage Index and the Medicare Geographic Adjustment Factor, which are used to adjust Medicare provider payment rates. Interestingly, the community rating coefficients in these columns are -12.24 percentage points and -12.19 percentage points, respectively. Controlling for these Medicare adjustment factors leads to estimated impacts on community rating that are slightly larger in magnitude. The next specification controls for marginal tax rates in 2010 for an annual income of $75,000, which are defined at the state level and were compiled by the National Bureau of Economic Research (NBER). It is plausible that differences in tax rates across states could affect incentives to use HSAs to accumulate pretax contributions, which could in turn affect Medigap purchasing decisions. Figure A7 shows marginal tax rates in guaranteed renewal and community rating states. Although there is considerable variation within each group of states, marginal tax rates appear to be slightly higher in community rating states, on average. Nevertheless, controlling for the marginal tax rate results in a community rating coefficient of -9.34 percentage points, which is not substantially different from the coefficient of -9.70 from the baseline specification. Thus, although it is plausible that some individuals could be affected by these tax incentives, they do not appear to be a main driver of the differences in Medigap enrollment.

5.8 Robustness Checks

Table A22 reports a series of robustness checks for the estimated impact of community rating on Medigap enrollment. These include specifications varying the sample definition, varying the distance from the regulatory boundary, and using alternative fixed effects models.

Panel A first shows estimates from the border states sample, which is expanded to include all Medicare beneficiaries living in community rating and bordering guaranteed renewal states, not only those living within 25 miles of the regulatory boundary. The community rating coefficient is substantially larger in magnitude, at -13.54 percentage points compared to -9.70 percentage points in the baseline specification. This implies that differences in Medigap enrollment are larger when comparing the populations of Medicare beneficiaries further away from the regulatory boundary. Of course, these populations are also imbalanced in terms of other observable characteristics (seen in Table 4). The next specification expands the sample to include Medicare beneficiaries who are eligible for Medicaid. The community rating coefficient is -9.34 percentage points, very similar to the coefficient of -9.70 percentage points from the baseline specification. Thus, the results are quite similar regardless of whether Medicare beneficiaries eligible for Medicaid are included or excluded from the sample. This is consistent with the fact that Medicaid eligibility appears to be relatively balanced, at least for the baseline specification, according to the comparison shown in Table A12. The next specification makes use of an interesting quirk that makes it possible to infer an individual's birth state. The first three digits of the Social Security Number (SSN) can be mapped to the state where the SSN was issued. For the vast majority of Medicare beneficiaries, this is likely the same as the birth state. This birth state variable is used to construct an indicator for whether an individual was born in a community rating state, which is used as an instrument for living in a community rating state (and has a strong first stage). This instrumental variables strategy can partially address potential bias arising from unobserved characteristics that differ for individuals choosing to live in community rating states. Interestingly, the community rating coefficient from this specification is -6.90 percentage points, which is somewhat smaller in magnitude but qualitatively similar to the coefficient from the baseline specification.

Panel B shows estimated impacts of community rating with varying distances to the regulatory boundary between community rating and guaranteed renewal states. The community rating coefficients are -11.44 percentage points for 100 miles, -10.03 percentage points for 50 miles, -9.70 percentage points for 25 miles (the baseline specification), -6.31 percentage points for 10 miles, and -4.98 percentage points for 5 miles. It is interesting that there appears to be a clear monotonic relationship with distance to the regulatory boundary. One possible interpretation is that for the population that includes a broad swath of Medicare beneficiaries further away from the regulatory boundary, there is more imbalance in various characteristics—observed and unobserved—that may also contribute to larger differences in

Medigap enrollment that reflect not only the impacts of community rating but also some bias due to these other characteristics. As the distance to the regulatory boundary becomes smaller, these imbalances are substantially smaller and the community rating coefficient also becomes smaller in magnitude. However, one should note that the population within 25 miles of the boundary already appears to be quite balanced according to Table 4.

Finally, Panel C explores alternative fixed effects models as opposed to the border segment fixed effects that are included in the baseline specification. In the first specification, the model includes a fixed effect for each combination of border segment and year, as opposed to including separate border segment fixed effects and year fixed effects. The community rating coefficient is -9.57 percentage points, which is very similar to the coefficient of -9.70 percentage points from the baseline specification. While either of these would be a reasonable baseline specification, including separate border segment fixed effects and year fixed effects has the very slight advantage that the border segment fixed effects correspond to the level of the relevant clusters (which are border segments). The second specification omits the border segment fixed effects and only includes year fixed effects. The resulting community rating coefficient is -7.18 percentage points, which is smaller in magnitude than in the baseline specification. This suggests that the magnitude of the estimated impact would be slightly understated without the inclusion of the border segment fixed effects. The next two specifications report community rating coefficients from including fixed effects for HSAs or HRRs, which are -10.15 percentage points and -8.89 percentage points, respectively. These are quite similar in magnitude to the coefficient from the baseline specification. The slight differences reflect the fact that including different fixed effects slightly alters the geographic areas that contribute identifying variation for the community rating coefficient.

Each of the estimated impacts reported in Table A22 is statistically significant at the 1 percent level, with the exception of the specification using HRR fixed effects, which is statistically significant at the 10 percent level. The community rating coefficients range from -4.98 percentage points to -13.54 percentage points, which are similar to the coefficient of -9.70 percentage points from the baseline specification. In summary, although there are some nuances as discussed above, the estimated impact of community rating on Medigap enrollment is robust across a broad range of alternative specifications.

6 Discussion

Community rating regulations are intended to generate transfers from the healthy to the sick in the form of lower premiums. However, these regulations can also lead to adverse selection and other related distortions. It is therefore important to understand the consequences of community rating regulations for market outcomes. In addition, it can be informative to examine how these adverse selection pressures vary with the stringency of community rating regulations and other features of the economic environment.

In this paper, I find large estimated impacts of community rating on several measures of adverse selection. Relative to guaranteed renewal, community rating leads to a decrease in Medigap enrollment of 9.70 percentage points (29.7%) and an increase in Medigap premiums of $276 (10.1%). I also find little evidence of benefits for those who would face higher premiums, as estimated decreases in Medigap enrollment are similarly large across a wide range of pre-existing health conditions, with slightly smaller impacts only for those with lung disease or kidney disease. This suggests that, at least when compared to guaranteed renewal regulations in the Medigap market, community rating regulations generate substantial distortionary effects with few clear benefits.

In this paper, I focus on the 3 states with the most stringent community rating regulations, each of which also implemented guaranteed issue requirements. However, it is also possible to examine adverse selection in other states with less stringent community rating regulations. To explore this, I use the same border regression discontinuity empirical strategy for 3 states that enacted community rating regulations but did not implement guaranteed issue—Arkansas (which implemented an age rating ban that was similar to a community rating law), Vermont, and Washington (which enacted a guaranteed issue law only much later). I exclude Minnesota and Massachusetts because their Medigap standardized plans differ from those in other states. I find that community rating (without guaranteed issue) leads to a 5.04 percentage point (26.2%) increase in Medigap enrollment and a $615 (29.4%) decrease in Medigap premiums. Interestingly, these effects are of the opposite sign compared to the effects of community rating with guaranteed issue. A full exploration of this alternative pricing regime is outside the scope of this paper, but these results suggest that community rating regulations may lead to less adverse selection in the absence of guaranteed issue.

Other aspects of the economic environment may also affect the extent of these adverse selection pressures. For instance, Clemens (2015) finds that in New England and Mid-Atlantic states that implemented stringent community rating regulations during the early 1990s, coverage rates initially fell substantially, indicating the presence of severe adverse selection pressures. However, when some of these states expanded Medicaid's coverage of relatively unhealthy adults during the late 1990s and early 2000s, this mitigated adverse selection by removing high-cost individuals from the relevant risk pool and allowed coverage rates to recover. In a related paper, Sen and DeLeire (2018) examine premiums for private plans in ACA marketplaces in neighboring counties that straddle states with and without Medicaid expansions, finding that premiums are 11% lower in Medicaid expansion states, also consistent with the idea that public health insurance programs can reduce adverse selection pressures by removing high-cost individuals from the risk pool. I find similar effects when I examine how Medicaid generosity interacts with the Medigap market. In states with stricter Medicaid eligibility requirements—meaning that more high-cost individuals remain in the Medigap risk pool—I find that community rating leads to a 22.7 percentage point (51.9%) decrease in Medigap enrollment, more than double the estimated decrease in the broader set of states.

Individual mandates can also reduce adverse selection pressures. Hackmann et al. (2015) find that the individual mandate in Massachusetts substantially reduced adverse selection and resulted in a welfare gain of 4.1% per person. Of course, no such individual mandate exists for the Medigap market, and it is not clear that one would be desirable, given that Cabral and Mahoney (2019) show that Medigap exerts substantial fiscal externalities on the public Medicare program. Nevertheless, this lack of an individual mandate may also contribute to the relatively large distortionary effects of community rating regulations in this market.

Finally, risk adjustment mechanisms can mitigate adverse selection pressures. Risk adjustment of payments to health plans has been used to counteract adverse selection in a variety of settings (Glazer and McGuire, 2000; Layton et al., 2018). There is no risk adjustment mechanism in the Medigap market. This is in stark contrast to MA, which has a relatively sophisticated risk adjustment mechanism. The lack of risk adjustment in the Medigap market suggests that adverse selection pressures could be greater in areas with a higher share of high-cost individuals. Indeed, I find that community rating regulations lead to more adverse selection in areas with a high share of older individuals. However, I do not find greater effects on adverse selection in areas with high mean risk scores or high mortality. One possible explanation could be due to the fact that in community rating states, insurers are not permitted to price on age but are still permitted to price on ZIP code. Thus, the effects of community rating regulations on adverse selection pressures may depend on the lack of risk adjustment in combination with the variables that can be used in insurer pricing.

7 Conclusion

This paper provides an empirical comparison of two of the leading regulatory approaches aimed at protecting those with pre-existing health conditions—"community rating" and "guaranteed renewal"—using unusually detailed comprehensive health insurance data on the Medigap market. I leverage a new data source that contains individual-level information on Medigap enrollment for 31 million aged Medicare beneficiaries during 2006–2010 and is linked to comprehensive Medicare administrative data that include Medicare enrollment information, demographic information, geographic location, and health care claims. I compare 3 states with community rating (and guaranteed issue)—Connecticut, Maine, and New York—and 6 comparison states with guaranteed renewal (and an initial open enrollment period)—Massachusetts, New Hampshire, New Jersey, Pennsylvania, Rhode Island, and Vermont. I focus on a narrow segment of individuals living within 25 miles of the regulatory boundary, who experience different pricing regulations but are otherwise similar on observable patient characteristics. I also estimate impacts for subgroups of individuals with pre-existing health conditions.

I find that community rating (with guaranteed issue) leads to substantial adverse selection. Compared to guaranteed renewal, community rating leads to a decrease in Medigap enrollment of 9.70 percentage points (29.7%) and an increase in Medigap premiums of $276

(10.1%). New Medigap enrollees in community rating states are more adversely selected in terms of their Medicare uncovered costs, health conditions, and health risk scores. Much of this adverse selection is driven by differences in the timing of Medigap purchase. Community rating leads to a decrease in the likelihood of an earlier Medigap purchase by 7.99 percentage points (50.3%) and an increase in Medigap purchase delay by 1.08 years (17.0%). There is no evidence of substitution between Medigap and MA, overall or among those with pre-existing conditions.

Somewhat surprisingly, effects of community rating on Medigap enrollment are quite similar across a broad range of pre-existing conditions. For low-spending pre-existing conditions, community rating impacts range from a decrease of 9.35 percentage points (26.8%) for those with heart disease to a decrease of 10.42 percentage points (33.7%) for those with no pre-existing conditions. For high-spending pre-existing conditions, community rating impacts range from a decrease of 6.88 percentage points (21.9%) for those with lung disease to a decrease of 10.52 percentage points (29.9%) for those with cancer. Although there is some variation across pre-existing conditions, with slightly smaller impacts for those with lung disease or kidney disease, all groups are impacted similarly by community rating. This suggests that there may be other unobserved characteristics affecting premium sensitivity, such as risk aversion, that covary with pre-existing conditions.

Community rating regulations are intended to generate transfers from the healthy to the sick in the form of lower premiums. However, these transfers can be undone if community rating regulations exacerbate adverse selection pressures. I find substantial adverse selection in the Medigap market. Furthermore, I find evidence that these adverse selection pressures vary with the stringency of community rating regulations as well as other features of the economic environment. For instance, adverse selection pressures appear to be less severe in a different set of states that implemented community rating but not guaranteed issue. In addition, adverse selection pressures are more severe in states with stricter Medicaid eligibility requirements, where more high-cost individuals remain in the Medigap risk pool. Adverse selection pressures are also probably exacerbated in the Medigap market due to the lack of an individual mandate or risk adjustment mechanism. Consistent with the importance of the lack of risk adjustment, I find more severe adverse selection pressures in areas with high shares of older individuals.

The results presented here are not fully generalizable to many other contexts, since the Medigap market is for supplemental coverage, not primary coverage, and it has a one-time open enrollment period. Nevertheless, these results may be informative for understanding health insurance market design more generally. The use of regulated private markets to provide public health insurance benefits has risen dramatically over the past 15 years (Geruso and Layton, 2017). As policymakers continue to debate and improve the design of individual health insurance markets, they might consider regulatory solutions that leverage beneficial features of both community rating and guaranteed renewal. For instance, restrictions on insurer pricing might be combined with guaranteed renewal and initial open enrollment periods at specific ages. Alternatively, consumers could pay financial penalties for entering the market later, as in Medicare Part D (Centers for Medicare and Medicaid Services, 2020). This is in contrast to current regulations in the ACA marketplaces, which use annually recurring open enrollment periods and do not penalize consumers who enroll at later ages even though they may exert substantial negative externalities on the market. In addition, as I find in the Medigap market, adverse selection pressures can be reduced through the use of complementary policies, such as the expansion of public health insurance programs that remove high-cost individuals from the risk pool, the use of individual mandates, and implementation of more sophisticated risk adjustment mechanisms.

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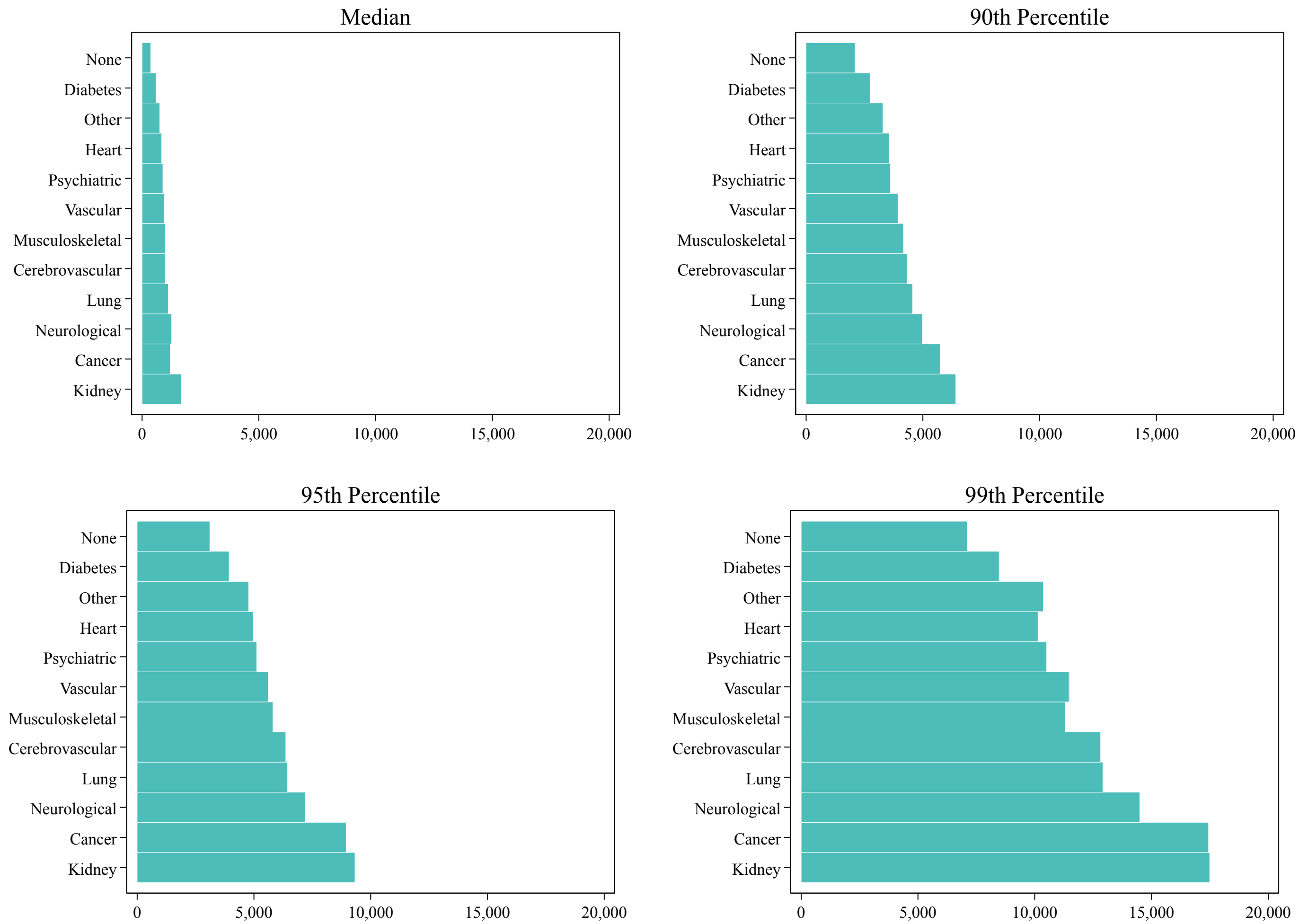
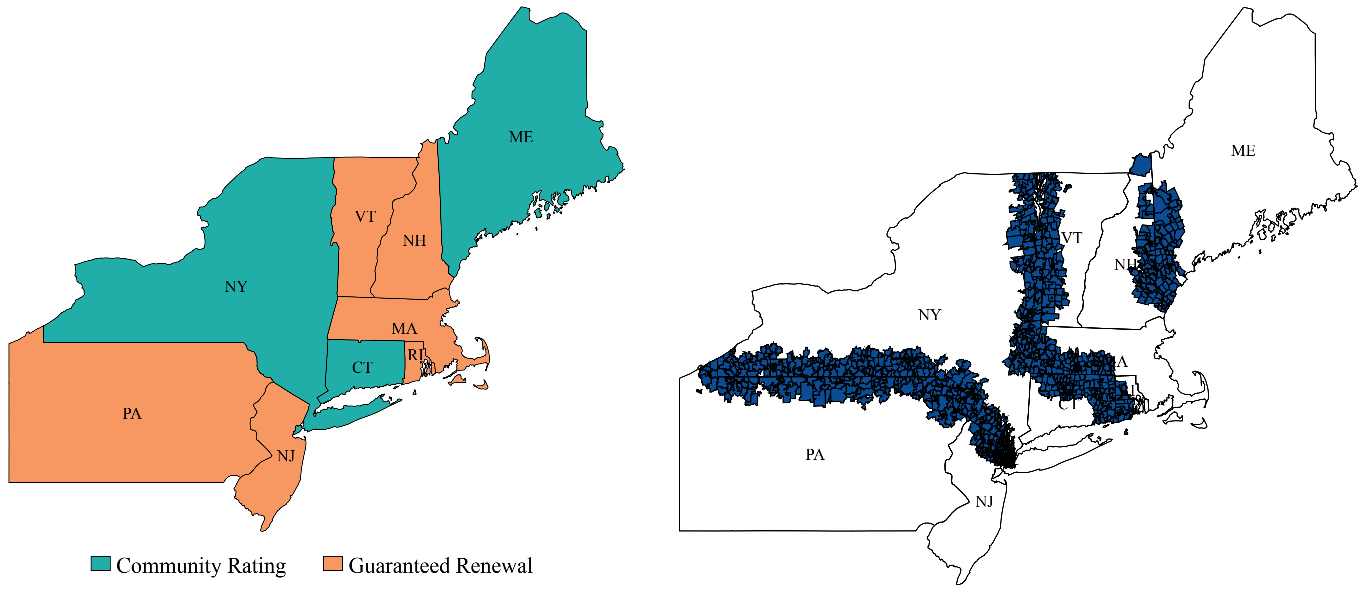
Figure 1: Distribution of Medicare Annual Uncovered Costs by Pre-Existing Condition



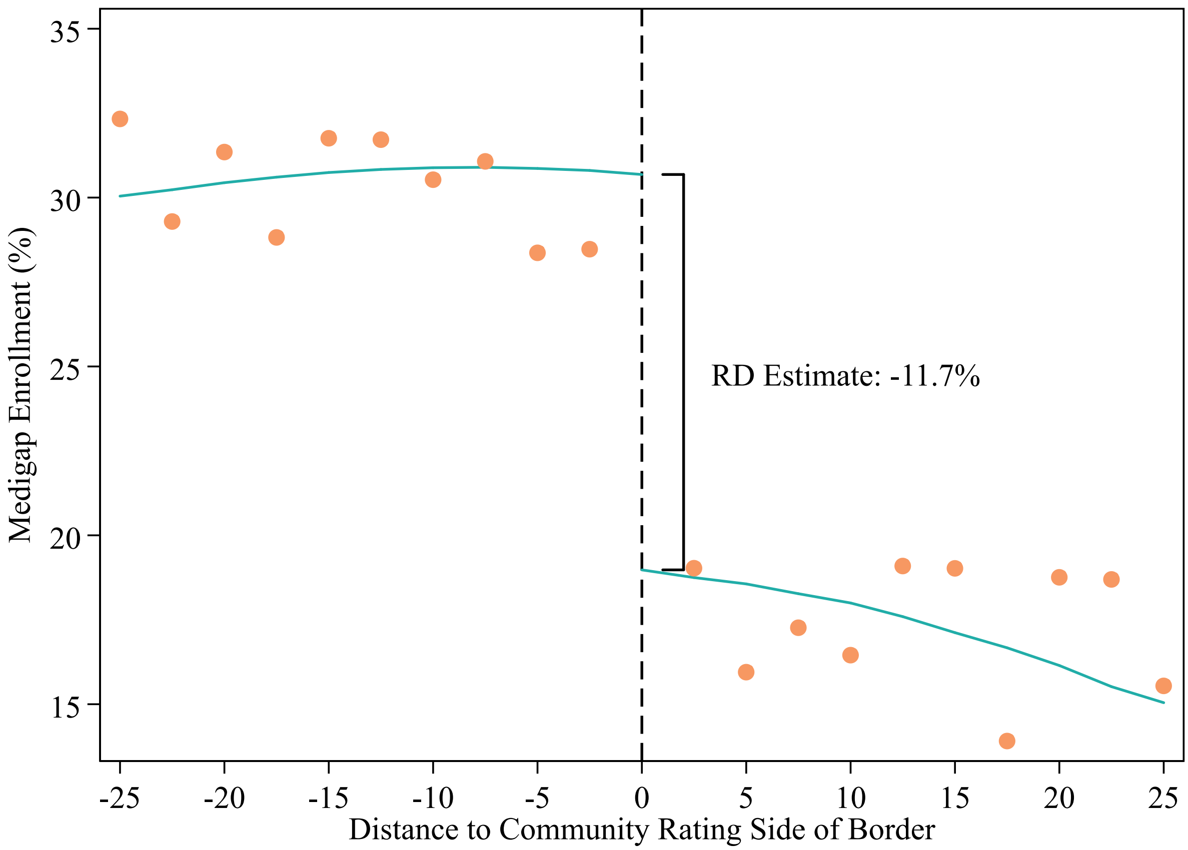
Notes: The figure shows the distribution of Medicare annual uncovered costs by pre-existing condition. This is based on Medicare claims from all aged Medicare beneficiaries enrolled in Parts A and B in 2010, the last year of the study period. The annual uncovered costs are obtained by summing all out-of-pocket costs for Parts A and B. If a Medicare beneficiary has Medigap, employer-sponsored supplemental insurance, or Medicaid, then these out-of-pocket costs are paid by the insurer. Otherwise, the Medicare beneficiary is responsible for these out-of-pocket costs. The annual uncovered costs for each pre-existing condition are computed based on all Medicare beneficiaries who have the condition during the observation year, regardless of whether it is the first year of diagnosis or a later year of diagnosis. The figure reports the median, 90th percentile, 95th percentile, and 99th percentile. All costs are reported in inflation-adjusted dollars for 2016.

Figure 2: Community Rating and Adjacent Guaranteed Renewal States



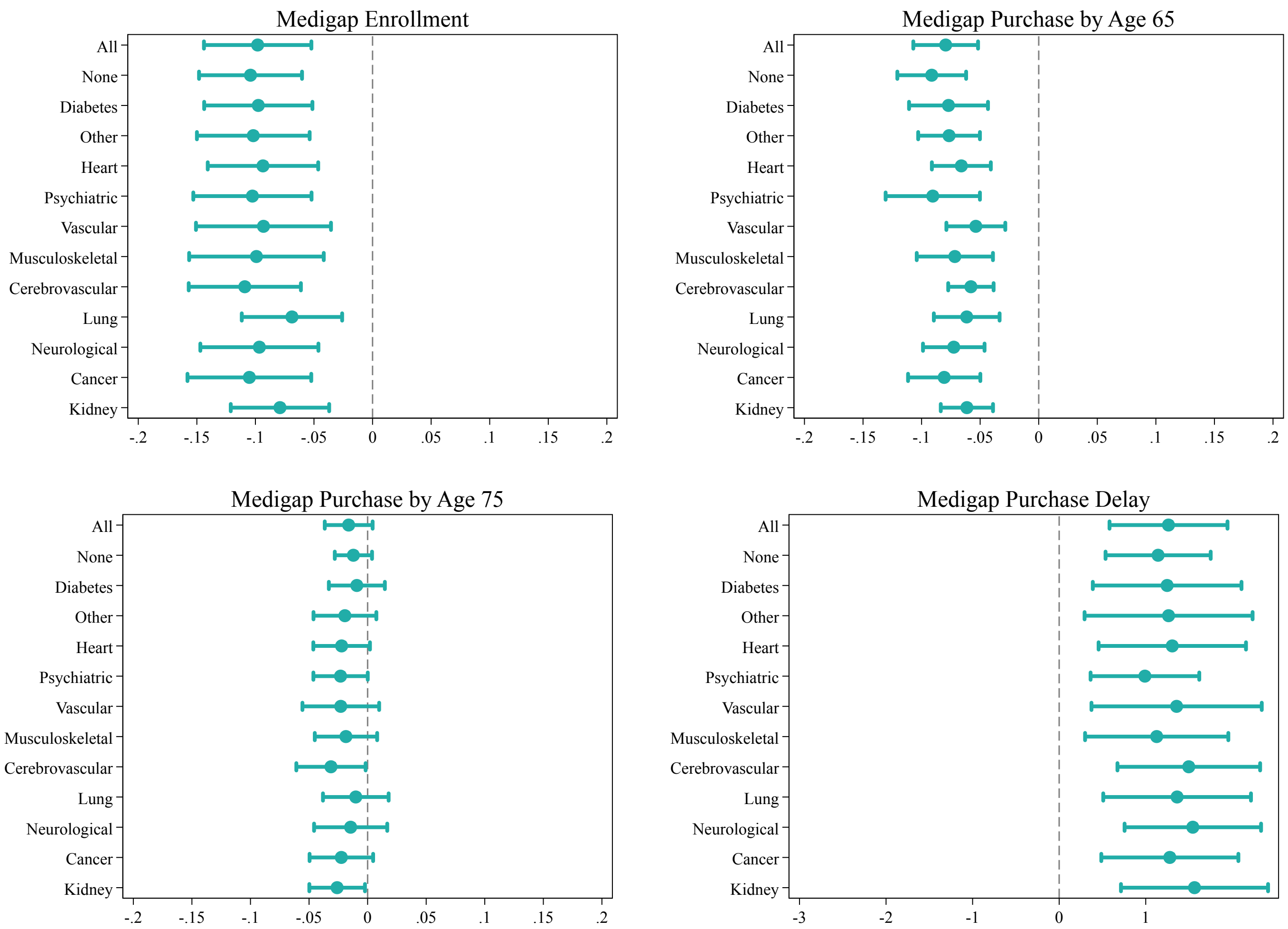
Notes: The figure depicts pricing regulations in the Medigap market. The map on the left shows the 3 states with community rating (and guaranteed issue)—Connecticut, Maine, and New York—and 6 comparison states with guaranteed renewal (and an initial open enrollment period)—Massachusetts, New Hampshire, New Jersey, Pennsylvania, Rhode Island, and Vermont. Guaranteed renewal is a federal regulation that was part of the Omnibus Budget Reconciliation Act of 1990. Community rating was implemented by Connecticut in 1994, Maine in 1993, and New York in 1993. The map on the right shows the ZIP codes within 25 miles of the regulatory boundary between community rating and guaranteed renewal states.

Figure 3: Regression Discontinuity Estimate of Impact on Medigap Enrollment



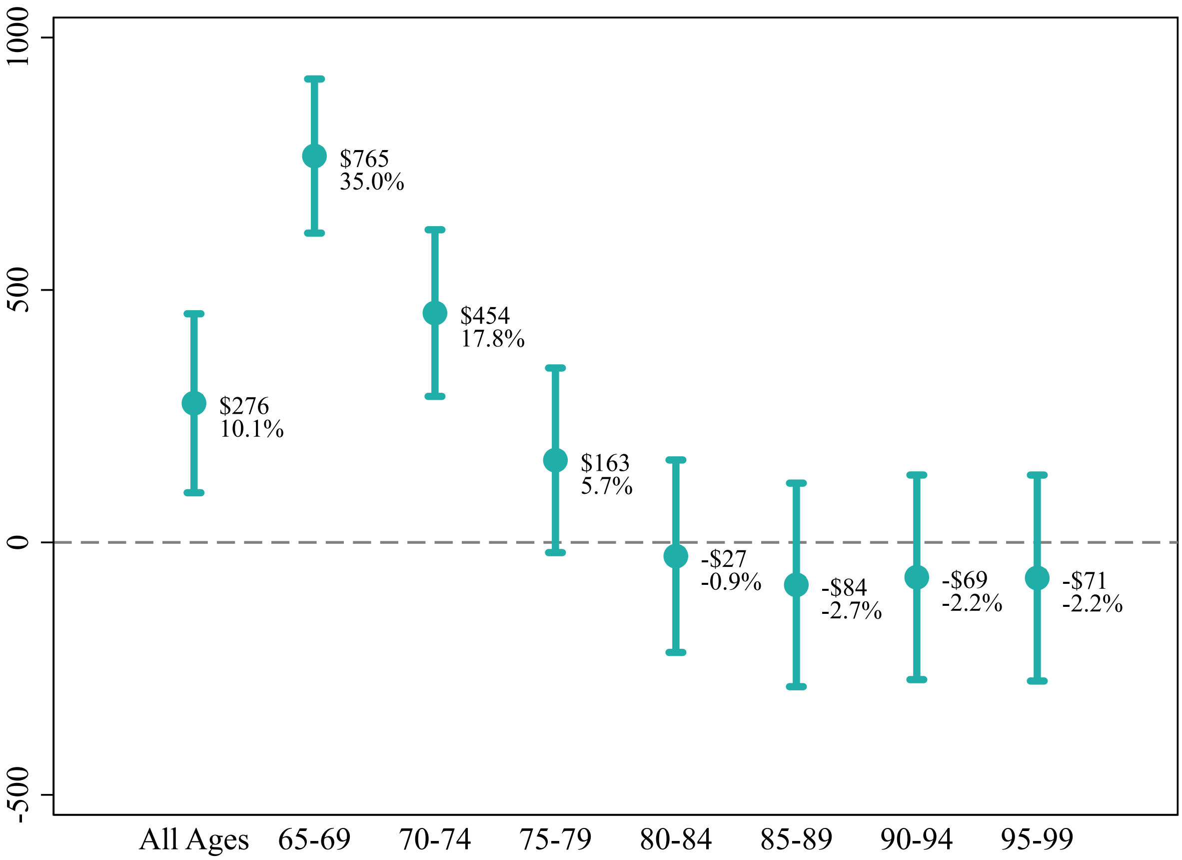
Notes: The figure shows the regression discontinuity (RD) estimate of the impact of community rating, compared to guaranteed renewal, on Medigap enrollment. The x-axis shows the distance in miles from the community rating side of the state border, with negative values representing Medicare beneficiaries living on the guaranteed renewal side of the border and positive values representing Medicare beneficiaries living on the community rating side of the border. The figure plots mean values of Medigap enrollment, using orange dots, for Medicare beneficiaries in distance bins that are centered at the labeled bin and are of width 5 miles. Mean values are adjusted using a linear regression model that includes border segment fixed effects and year fixed effects. The figure also plots fitted values of Medigap enrollment, using green lines, from a linear regression model that includes an indicator for community rating, a cubic polynomial function of distance, border segment fixed effects, and year fixed effects. The figure shows the RD estimate, the coefficient on an indicator for community rating, which is statistically significant at the 1% level.

Figure 4: Impacts on Medigap Enrollment, Medigap Purchase by Age 65, Medigap Purchase by Age 75, and Medigap Purchase Delay



Notes: The figure shows the impacts of community rating, compared to guaranteed renewal, by pre-existing health condition category. The figure plots the estimated impacts from Table A14, Table A15, Table A16, and Table A17, with 95 percent confidence intervals represented by bars.

Figure 5: Impacts on Medigap Premiums



Notes: The figure shows the impacts of community rating, compared to guaranteed renewal, overall and by age category. The figure is based on Weiss Ratings data from 2006–2010 on annual premiums for each combination of ZIP code, year, insurer, sex, and age. Within each combination of ZIP code, year, insurer, sex, and age, the premium is constructed as a simple average of the premiums offered for plan A (the least generous plan) and plan F (the most generous plan) (for the 88% of observations for which both of these plans are offered). The figure plots the estimated coefficient on an indicator for community rating from a linear regression model, where the dependent variable is the premium and the specification includes sex, age, year, and border segment fixed effects. Each observation is weighted by the population of Medicare beneficiaries in the ZIP code, year, sex, and age combination. The sample is limited to insurers with at least a 1% state-year-level market share based on data from the National Association of Insurance Commissioners (NAIC). The bars represent 95% confidence intervals. Standard errors are clustered by border segment.

Table 1: Timeline of Medigap Pricing Regulations

Year	Event
1990	OBRA-90 passed Age rating ban in Arkansas Attained age rating ban in Georgia Attained age rating ban in Washington
1992	OBRA-90 enacted Guaranteed issue law in New York
1993	Attained age rating ban in Florida Community rating law and guaranteed issue law in Maine Community rating law in Minnesota Community rating law in New York
1994	Community rating and guaranteed issue law in Connecticut Community rating law in Massachusetts
1995	Attained age rating ban in Idaho
1996	Community rating law in Washington
1997	Community rating law in Vermont
1999	Gender rating ban and area rating ban in Idaho
2000	Annual open enrollment period law in California
2005	Ban on attained age rating based on month-day increments in Kentucky Guaranteed issue law in Washington
2006	Gender rating ban in Arkansas
2009	Limits on premiums offered outside open enrollment period in Ohio

Notes: The table shows a timeline of federal and state pricing regulations. Guaranteed renewal (and an initial open enrollment period) is a federal regulation that was part of the Omnibus Budget Reconciliation Act of 1990 (OBRA-90). OBRA-90 also included provisions such as Medigap plan standardization and minimum Medical Loss Ratios (MLRs). Community rating (and guaranteed issue) was implemented by Connecticut in 1994, Maine in 1993, and New York in 1992–1993. The table shows additional regulations affecting the aged Medicare population.

Table 2: Declinable Conditions in the Medigap Market

Health Condition
AIDS/HIV
Heart Attack
Alcohol Abuse/Drug Abuse
Kidney Disease, Renal Failure
ALS (Amyotrophic Lateral Sclerosis)
Lupus (SLE)
Alzheimer's/Dementia
Multiple Sclerosis
Arrhythmia, Irregular Heartbeat, Heart Rhythm Disorders
Myasthenia Gravis
Arthritis (Rheumatoid), Fibromyalgia, Other Inflammatory Joint Disease
Pacemaker
Cancer
Parkinson's Disease
Chronic Obstructive Pulmonary Disease (COPD)/Emphysema
Pending Surgery or Hospitalization
Cirrhosis of Liver
Peripheral Vascular Disease
Congestive Heart Failure
Stroke
End-Stage Renal Disease (ESRD)

Notes: The table is based on the author's review of 14 manuals for field agents with medical underwriting guidelines from Aetna (national), UnitedHealthcare (WA, TX), Anthem (CA), Blue Cross Blue Shield (MI, WA, CA), Humana (national), Central States Indemnity (national), Standard Life (national), Old Surety Life (OK), AARP (FL), and Gerber (national). Health conditions in the table appeared on declinable conditions lists in half or more of the manuals reviewed.

Table 3: Sample Definition

	All States	Border States	Boundary Zip Codes	25-Mile Radius
	(1)	(2)	(3)	(4)
Female	56.8	58.3	57.9	57.5
Ages 65-66	10.4	9.1	9.5	9.4
Ages 67-74	39.0	36.1	36.9	36.5
Ages 75+	50.6	54.7	53.6	54.1
Any health condition	53.8	57.4	56.1	56.4
Community rating state	7.6	39.7	68.5	39.7
Distance to border (miles)	72.8	27.6	33.4	13.8
Within 25 miles of border	32.1	56.6	52.9	100.0
New York City	2.1	11.1	21.6	0.0
Died during year	3.9	4.0	3.9	4.0
Medicare costs	9,532	10,552	10,027	10,138
Medicare uncovered costs	1,423	1,519	1,450	1,486
Median income in zip code	41,343	42,294	40,149	42,745
Urban zip code	77.5	88.9	83.6	82.1
Medigap	24.7	24.9	22.0	28.7
Medicare Advantage	25.4	28.5	27.6	17.4
Pre-existing conditions:				
None	46.2	42.6	43.9	43.6
Diabetes	7.1	6.9	7.0	6.9
Other	1.9	1.9	1.9	1.9
Heart	7.4	7.6	7.7	7.8
Psychiatric	0.9	0.8	0.8	0.8
Vascular	4.9	6.8	6.1	6.4
Musculoskeletal	2.3	2.4	2.4	2.4
Cerebrovascular	1.5	1.6	1.5	1.5
Lung	6.8	7.1	7.1	7.2
Neurological	4.3	4.0	3.9	3.9
Cancer	10.4	12.3	11.9	11.9
Kidney	6.3	5.9	5.7	5.6
States	51	9	9	9
Border segments	820	89	44	44
Zip codes	38,877	6,951	3,408	1,357
Unique individuals	31,057,674	5,926,866	2,441,598	894,013
Observations	119,779,566	22,931,674	9,350,510	3,448,525

Notes: The table shows the means of variables listed for different sample definitions. Column 1 shows the "All States" sample, which includes all aged Medicare beneficiaries in 2006–2010. Column 2 shows the "Border States" sample, which includes only the 3 community rating and 6 guaranteed renewal states. Column 3 further restricts the sample to ZIP codes along the regulatory boundary between community rating and guaranteed renewal states. Column 4 is the main analysis sample, which is aged Medicare beneficiaries in 2006–2010 living within 25 miles of the regulatory boundary between community rating and guaranteed renewal states, excluding Medicaid-eligible beneficiaries and New York City residents.

Table 4: Tests for Balance on Predetermined Observable Characteristics

	All States	Border States	Boundary Zip Codes	25-Mile Radius
	(1)	(2)	(3)	(4)
Median household income	-137	-6,440**	-6,429**	1,325
	(632)	(3,140)	(3,166)	(3,204)
Education: < HS	0.0230***	0.0522***	0.0522***	0.0190
	(0.0063)	(0.0178)	(0.0180)	(0.0251)
Education: HS graduate	0.0168***	-0.0397***	-0.0398***	-0.0090
	(0.0036)	(0.0073)	(0.0073)	(0.0120)
Education: College graduate	0.0038	0.0056	0.0057	0.0063
	(0.0060)	(0.0099)	(0.0101)	(0.0194)
Poverty rate	0.0207***	0.0525**	0.0525**	-0.0049
	(0.0041)	(0.0225)	(0.0226)	(0.0148)
Veteran	-0.0817***	-0.0859***	-0.0859***	-0.0131
	(0.0074)	(0.0270)	(0.0272)	(0.0177)
Labor force participation rate	-0.0005	-0.0299***	-0.0299***	-0.0049
	(0.0023)	(0.0092)	(0.0092)	(0.0080)
Homeownership rate	-0.1362***	-0.1526***	-0.1527***	-0.0066
	(0.0107)	(0.0549)	(0.0552)	(0.0300)
Joint F-test p-value	<0.0001	<0.0001	<0.0001	0.7680
Observations	119,779,568	22,931,674	9,350,510	3,448,525

Notes: The table reports results from testing balance on observable characteristics in community rating versus guaranteed renewal states. The table reports estimates from a linear regression of an indicator for community rating on the variable listed in the row. The sample is the main analysis sample, which is aged Medicare beneficiaries in 2006–2010 living within 25 miles of the regulatory boundary between community rating and guaranteed renewal states, excluding Medicaid-eligible beneficiaries and New York City residents. The model includes border segment fixed effects and year fixed effects. The p-value reported at the bottom shows an F-test of joint significance for the variables listed in the table. Observations are at the individual-year level. Robust standard errors, clustered by border segment, are shown in parentheses. $^{*}p < 0.1$, $^{**}p < 0.05$, $^{***}p < 0.01$.

Table 5: Impacts on Medigap Enrollment

	(1)	(2)	(3)	(4)
Community Rating	-0.0981***	-0.0974***	-0.0971***	-0.0970***
	(0.0234)	(0.0235)	(0.0236)	(0.0236)
Year FEs	N	Y	Y	Y
Gender FEs	N	Y	Y	Y
Age Bin FEs	N	N	Y	Y
Disease FEs	N	N	N	Y
GR Dep. Var. Mean	0.327	0.327	0.327	0.327
CR Effect Size (%)	-30.0	-29.8	-29.7	-29.7
R^2	0.029	0.035	0.038	0.039
Clusters	44	44	44	44
Observations	3,448,525	3,448,525	3,448,525	3,448,525

Notes: The table reports impacts of community rating on Medigap enrollment, using the main analysis sample, which is aged Medicare beneficiaries in 2006–2010 living within 25 miles of the regulatory boundary between community rating and guaranteed renewal states, excluding Medicaid-eligible beneficiaries and New York City residents. Observations are at the individual-year level. Robust standard errors, clustered by border segment, are shown in parentheses. $^{*}p < 0.1$, $^{**}p < 0.05$, $^{***}p < 0.01$.

Table 6: Impacts on Medigap Purchase by Age 65 and Medigap Purchase Delay

Panel A: Medigap Purchase by Age 65

	(1)	(2)	(3)	(4)
Community Rating	-0.0794***	-0.0790***	-0.0799***	-0.0799***
	(0.0141)	(0.0142)	(0.0143)	(0.0144)
Year FEs	N	Y	Y	Y
Gender FEs	N	Y	Y	Y
Age Bin FEs	N	N	Y	Y
Disease FEs	N	N	N	Y
GR Dep. Var. Mean	0.159	0.159	0.159	0.159
CR Effect Size (%)	-50.0	-49.8	-50.3	-50.3
R^2	0.017	0.020	0.051	0.051
Clusters	44	44	44	44
Observations	3,448,525	3,448,525	3,448,525	3,448,525

Panel B: Medigap Purchase Delay

	(1)	(2)	(3)	(4)
Community Rating	1.2633***	1.2543***	1.0784***	1.0824***
	(0.3477)	(0.3508)	(0.3853)	(0.3871)
Year FEs	N	Y	Y	Y
Gender FEs	N	Y	Y	Y
Age Bin FEs	N	N	Y	Y
Disease FEs	N	N	N	Y
GR Dep. Var. Mean	6.378	6.378	6.378	6.378
CR Effect Size (%)	19.8	19.7	16.9	17.0
R^2	0.018	0.022	0.287	0.288
Clusters	44	44	44	44
Observations	1,247,605	1,247,605	1,247,605	1,247,605

Notes: The table reports impacts of community rating on Medigap purchase by age 65 or Medigap purchase delay, using the main analysis sample, which is aged Medicare beneficiaries in 2006–2010 living within 25 miles of the regulatory boundary between community rating and guaranteed renewal states, excluding Medicaid-eligible beneficiaries and New York City residents. Observations are at the individual-year level. Robust standard errors, clustered by border segment, are shown in parentheses. $^{*}p < 0.1$, $^{**}p < 0.05$, $^{***}p < 0.01$.

Table 7: Heterogeneity in Impacts on Medigap Enrollment

Panel A: Medicaid Generosity

	Strict Medicaid Eligibility (1)	Low Medicaid Provider Rates (2)	High Medicaid Provider Rates (3)	
Community Rating	-0.2266***	-0.0942***	-0.0050	
	(0.0297)	(0.0216)	(0.0329)	
GR Dep. Var. Mean	0.4364	0.3904	0.1807	
CR Effect Size (%)	-51.9	-24.1	-2.8	
R^2	0.0869	0.0534	0.0805	
Observations	2,235,253	1,972,489	1,476,036	
Clusters	41	33	34	

Panel B: Age Distribution

	Low Share Ages 85+ (1)	Medium Share Ages 85+ (2)	High Share Ages 85+ (3)	
Community Rating	-0.0952***	-0.0972***	-0.1664***	
	(0.0338)	(0.0306)	(0.0530)	
GR Dep. Var. Mean	0.3062	0.3330	0.3771	
CR Effect Size (%)	-31.1	-29.2	-44.1	
R^2	0.0696	0.0870	0.0872	
Observations	531,446	2,478,564	438,515	
Clusters	43	42	36	

Panel C: Health Risk Distribution

	Low Risk (1)	High Risk (2)	Low Mortality (3)	High Mortality (4)
Community Rating	-0.0838***	-0.0081	-0.0904***	-0.0154
	(0.0228)	(0.0184)	(0.0265)	(0.0251)
GR Dep. Var. Mean	0.3315	0.2440	0.3370	0.2531
CR Effect Size (%)	-25.3	-3.3	-26.8	-6.1
R^2	0.0765	0.1336	0.0752	0.1269
Observations	2,661,616	786,909	2,468,556	979,969
Clusters	43	14	43	18

Notes: The table reports impacts of community rating on Medigap enrollment for: states with strict Medicaid eligibility requirements (Connecticut, New Hampshire, New York, and Vermont); states with low (Maine, New Hampshire, New Jersey, New York, Rhode Island) and high (Connecticut, Massachusetts, Pennsylvania, Vermont) Medicaid provider payment rates; ZIP codes with an age 85+ share below the 10th percentile, from the 10th to 90th percentiles, and above the 90th percentile; and ZIP codes with mean risk scores or mortality rates above and below the median. Observations are at the individual-year level. Robust standard errors, clustered by border segment, are shown in parentheses. $^{*}p < 0.1$, $^{**}p < 0.05$, $^{***}p < 0.01$.