Selection Across
U.S. Health Insurance Markets

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Models of consumer choice and selection in health insurance markets typically focus on decisions within one market setting (e.g. the choice of plans offered by an employer). This paper focuses on selection and choice at the broader level of health care markets, comparing Medicaid, employer sponsored insurance, and insurance exchanges. I study cross-market adverse selection in the context of the Affordable Care Act, which simultaneously expanded Medicaid while creating health insurance exchanges. Comparing Medicaid expansion and non-expansion states, I find that the individual market in expansion stats has healthier enrollees, lower costs, and premiums which are 10% lower than in non-expansion states. Then, using variation in federal reinsurance payments as identification, I find that price increases on individual health insurance exchanges lead lower-income consumers to become uninsured, and higher income consumers switch to employer-sponsored coverage.

JEL: H51, I11, I13

In health insurance markets, adverse selection occurs when consumers with more costly medical conditions are more likely to purchase some insurance product. Existing models of adverse selection generally assume all insurance is sold in a single market (e.g. Einav, Finkelstein and Cullen (2010); Handel, Hendel and Whinston (2015); Tebaldi, Torgovitsky and Yang (2019)).[1] But, in the United States, there exist multiple public and private health insurance markets, including Medicaid, Medicare, employer-sponsored insurance, and the health insurance exchanges. Average disease burden, the price of coverage, and plan characteristics vary widely across these different markets. This paper asks: Is adverse selection *across* health insurance markets relevant for U.S. policy?

In particular, I study how selection affects our interpretation of the impacts of Medicaid expansion, enacted as a part of the Affordable Care Act (ACA). The ACA increased health insurance coverage in a piece-meal approach, by both expanding Medicaid eligibility to a larger group of low-income Americans, and by creating individual health insurance exchanges for those with higher incomes. If there is selection across these two markets, then Medicaid expansion can lower premiums on the individual market by reducing the number of high-risk enrollees who choose to purchase individual insurance. However, because of strong correlation across different health insurance policies, it is difficult to attribute what changes were driven specifically by Medicaid expansion. Moreover, existing health insurance data is scattered across many data sources, and it is rare to have access to comprehensive data that covers all insurance markets simultaneously.

The goal of this paper is to provide the most comprehensive description possible of cross market selection using currently available data, and the degree that consumers switch across markets in response to price changes. My identification strategy relies on large price variation on individual exchanges driven by federal reinsurance payments, which allows me to trace out a demand curve for individual insurance and measure the degree of substitution across the individual exchanges, Medicaid, and employer-sponsored coverage.

At the core of my empirical approach is a theoretical model which shows how adverse selection operates across markets. Existing models of show how adverse selection is driven by variation in demand among consumers (e.g. Einav, Finkelstein and Cullen (2010)). In my cross-market model, adverse selection is driven by variation in both consumer demand and *eligibility* for insurance. In the case of Medicaid expansion, new Medicaid enrollment crowds-out enrollment in private markets, such as the individual market. If those who switch from the individual market to Medicaid are adversely selected, then Medicaid expansion would reduce prices in the individual market. Lower prices on the individual market could then lead to an increase in coverage among those ineligible for Medicaid. The reduced-form estimate of an adversely selected Medicaid expansion on individual market thus combines two effects: Crowd-out from expanded Medicaid eligibility,

[1] Other studies also look at adverse selection in who purchases health insurance at all (e.g. Hackmann, Kolstad and Kowalski (2015)), or adverse selection on both of these margins (e.g. Azevedo and Gottlieb (2017); Geruso et al. (2019))

and crowd-in from lower prices.

Next, I estimate how demand on the individual market responds to price changes, and whether consumers switch to other markets in response to these price changes. To predict price changes on the individual market, I use arbitrary changes in premiums driven by the phase-out of federal reinsurance and risk corridor programs in 2017. Federal reinsurance and risk corridor programs payments varied from an average of \$140 per enrollee in Rhode Island to \$2200 per enrollee in South Dakota. When these payments were phased-out in 2017, premiums rose approximately 1-for-1 on individual exchanges. I then find that, for every \$1000 increase in prices on the individual market, total enrolment on the individual market drops by 19%. How consumers respond depends on their income: Higher income consumers appear to switch to employer-sponsored coverage, while lower income consumers become uninsured.

Next, to measure the crowd-out effect of Medicaid, I perform a descriptive analysis where I compare states which expanded Medicaid in 2014 to those that did not. While Medicaid expansion is an imperfect natural experiment,[2] this analysis clearly shows that Medicaid expansion crowded out coverage on the individual market, and that expansion states have a healthier population on their individual markets. I find that enrollees on individual insurance exchanges in non-expansion states incurred 10% more health insurance spending relative to non expansion states, which ultimately led to higher premiums relative to non-expansion states.

This paper is among a large literature since Akerlof (1970) that have applied a model of adverse selection to data from U.S. health insurance markets. This literature has looked at adverse selection in firms (Einav, Finkelstein and Cullen, 2010; Bundorf, Levin and Mahoney, 2012), and in regulated health insurance exchanges (Handel, Hendel and Whinston, 2015; Tebaldi, Torgovitsky and Yang, 2019; Hackmann, Kolstad and Kowalski, 2015; Azevedo and Gottlieb, 2017; Geruso et al., 2019; Saltzman, 2017). These papers have made important advancements in understanding how adverse selection operates in a homogeneous market, where all consumers purchase insurance or remain uninsured. My contribution to this literature is to show that, in the U.S. context, the existence of multiple health insurance markets can be important for interpreting both welfare and for simulating the effects of policy.

This paper contributes to and reinterprets an older literature on the crowd-out effect of public insurance expansions, which began with Cutler and Gruber (1996) (see Gruber and Simon (2008) for an early review, and Frean, Gruber and Sommers (2017) for a later review). This literature generally assumed that crowd-out makes insurance expansions less effective, because increases in public coverage are counter-acted by decreases in private coverage. My contribution to this literature is to show that crowd-out can actually

[2] Selection into Medicaid expansion was largely driven by partisan goals: All non-expansion states were either fully or partially controlled by Republicans in 2014

strengthen private markets if it targets an adversely selected population. A more recent literature estimates the aggregate effect of crowd-out in the ACA, and finds that crowd-out was either non-existent or small (Frean, Gruber and Sommers, 2017). I show that focusing on aggregate crowd-out can mask substantial heterogeneity across different types of consumers. In the case of Medicaid expansion, substantial crowd-out among the newly Medicaid eligible was counteracted by crowd-in among those responding to lower prices on the individual market.

The closest antecedents to my work are that of Clemens (2015) and Peng (2017). These papers report the effect of Medicaid expansion on the price in certain private markets (Clemens (2015) shows this for community rated markets pre-ACA, and Peng (2017) shows this for Pennsylvania and Indiana post ACA). My paper using Medicaid expansion as a natural experiment confirms that these results hold when applied to the ACA as a whole. I then build on these results to show how these price changes on the individual markets affected how consumers re-sorted across markets, including interactions with employer-sponsored insurance.

This paper proceeds as follows. In Section 1, I present my theoretical model which shows how adverse selection interacts with eligibility when considering how consumers sort across markets. In Section 2, I describe U.S. health insurance markets and the datasets I will use to document selection across markets. In Section 3, I show reduced-form estimates of the effect of price changes in the individual market on individual market demand. In Section 4, I provide a descriptive analysis of selection differences leading to price differences on the individual market in expansion and non-expansion states. In Section 5, I conclude.

1 Theoretical Model

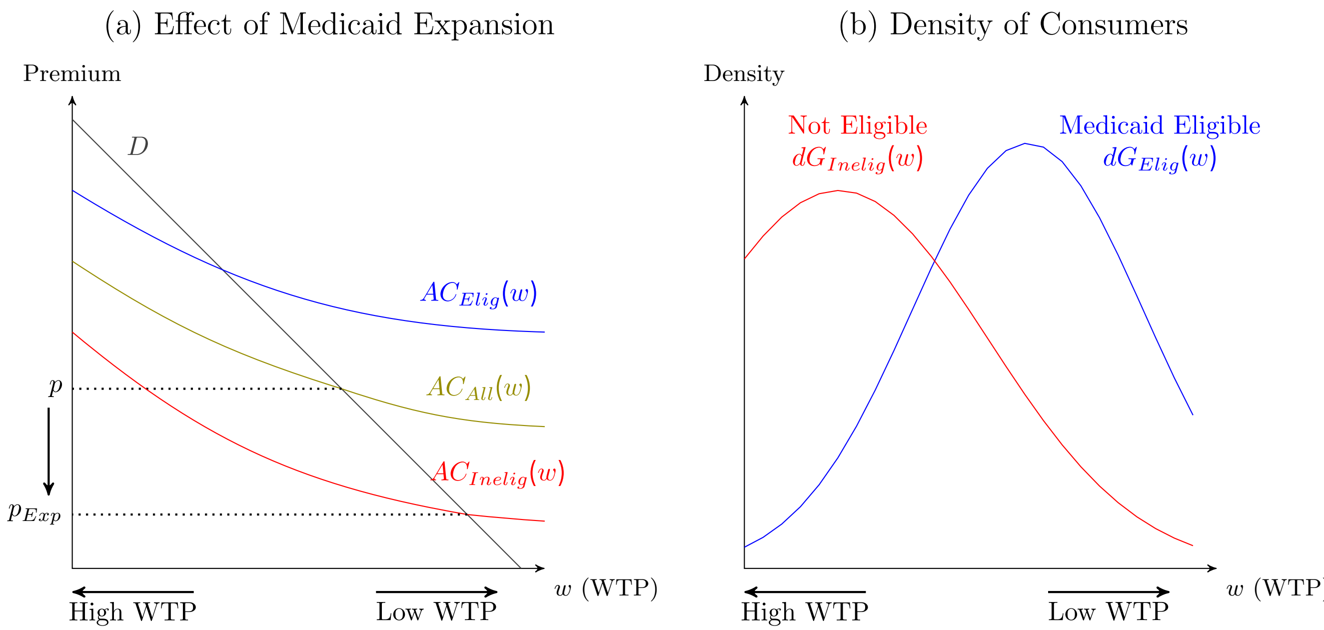
In this section, I develop a theoretical model of how consumers select across multiple insurance markets. This model is similar in spirit to Einav, Finkelstein and Cullen (2010), except that consumers select an insurance *market* rather than an insurance *product*. Selecting a market is similar to choosing products except that many consumers are not eligible to purchase insurance in all markets. For example, Medicaid is available only to those who pass a means test, and employer-sponsored insurance is available to only those are household members of an employees of firms that offer coverage. As a result, adverse selection will be driven by both demand and eligibility, and policies impacting eligibility can impact adverse selection.

1.1 Graphical Model

In this section, I develop a simple model which shows how a public health insurance expansion can affect a private market. To correspond to the natural experiment described in future sections, I will denote the public market as “Medicaid,” and the private market as “individual market.”

Consider a population that, initially, is able to purchase insurance on only the individual market. Suppose there exists only a single, standardized health insurance product on the individual market, sold at a premium p. This plan is guaranteed-issue, meaning insurers cannot deny coverage to any consumer, and community-rated, meaning prices do not vary across consumers according to their health status. Suppose each consumer i has a willingness to pay for private insurance w_i, and the cumulative distribution of willingness to pay in the population is $G(w)$. When insured, each consumer generates c_i medical costs, and the average cost to insure all consumers with willingness to pay under p is $AC_{All}(w)$. Finally, assume that the insurance market is competitive and there exists a single equilibrium where $p = AC_{All}(p)$.

Figure 1: Market Equilibrium in the Individual Market



The baseline equilibrium is shown in Figure 1a, where $AC_{All}(w)$ crosses the demand curve. This figure replicates the core graph from Einav, Finkelstein and Cullen (2010), except that I scale the x-axis by willingness to pay. Scaling by williness to pay means that demand will always be a 45° line, and the underlying distribution of people is not uniform. An example of how individuals can be distributed is shown in Figure 1b.

Now suppose the government is considering an expansion of public health insurance, Medicaid. Suppose further that there is a 100% take-up of Medicaid (i.e. all those who are eligible for Medicaid take it up). I can then define new functions G_{Elig} and G_{Inelig} where are the cumulative distributions of willingness to pay for those who are eligible for Medicaid expansion and those who are not. Similarly, $AC_{Elig}(w)$ and $AC_{Inelig}(w)$

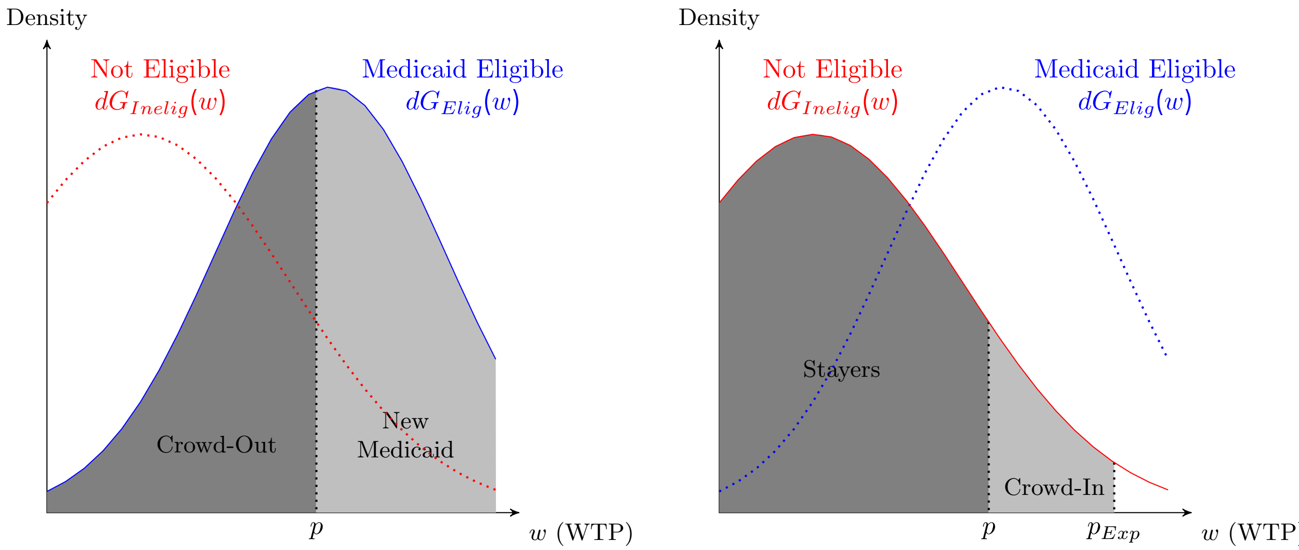
are average costs for each of these groups.

As shown in Figure 1a, the effect of Medicaid expansion on the private market depends on the relative position of the two curves $AC_{Inelig}(w)$ and $AC_{All}(w)$. The figure shows an example where $AC_{Inelig}(w)$ is below $AC_{All}(w)$, which means the population that is ineligible for Medicaid is advantageously selected relative to the population that is eligible for Medicaid, conditional on willingness to pay. In this case, after Medicaid expansion, prices in the individual market would drop from p to p_{Exp}.

Figure 2: Impact of Medicaid Expansion on Individual Types

(a) Medicaid Eligible

(b) Not Eligible for Medicaid



To decompose the effect of Medicaid expansion it is helpful to divide the population into groups. In Figure 2a, I show the effect of the policy on those who gain access to Medicaid. Among this group, those who have a high willingness to pay for insurance are "crowded-out" of private coverage by Medicaid. Those with a low willingness to pay for insurance go from having no insurance to having Medicaid. Among those who remain ineligible for Medicaid, which I show in Figure 2b, there are the "stayers" who are willing to purchase insurance at price p. In addition, if prices drop as a result of Medicaid expansion, there will be additional "crowd-in" of individuals who are ineligible for Medicaid but are willing to purchase insurance at the lower price p_{Exp}. To calculate the welfare effects of Medicaid expansion, governments should consider both the direct effects to new Medicaid enrollees, as well as the indirect effects to individual market participants, both to stayers (who pay lower prices) and to those who crowd-in.

2 Data Sources

The market for U.S. health insurance is divided into segments, each governed by separate legislation. The private market has three main segments: Firms with 2-50 employees purchase insurance in the small group market,[3] firms with over 50 employees purchase insurance in the large group market, and individuals who don't purchase insurance through their employer participate in the individual market. Medicaid is a state-level program that covers individuals who meet a means test and those who qualify for Supplemental Security Income. Medicare is an entitlement program offered to all those who are over 65 years of age, as well as those who receive Social Security Disability Income and individuals diagnosed with End Stage Renal Disease.

The data sources needed to track cross-market selection are disparate and difficult to link. Public use data on different markets tends to be reported by separate groups and agencies, and can be hard to compare plan quality and premiums across markets. Moreover, premiums in both the large group health insurance markets are negotiated separately for each contract, and these contract details are typically treated as trade secrets. As a result, premiums for health insurance products do not appear in most administrative data sources accessible to researchers, and the most of our knowledge about health insurance premiums comes from surveys, which often lack data on the characteristics of the enrolled population.

The best quality administrative data is also imperfect to study cross-market selection. Most papers with administrative data only study a single market (be it Medicaid, Medicare, an individual exchange, or a single employer). The best quality cross-market health insurance characteristics can be found in All-Payer Claims Datasets, but this data is not available nationally, and generally is not linked to variables necessary to estimate demand (like income and employment status). By contrast, the best administrative dataset for studying cross market health insurance demand is from IRS tax records, which include health insurance information on form 1095, which has been used since 2014. But this tax data still does not contain detailed records of the health status of individuals switching between health insurance markets.

Lacking a single "optimal" dataset, this paper aims to provide the best possible study of cross-market selection in the years since the Affordable Care Act using only widely available publicly available datasets. I will make use of regulatory submissions by insurers, survey data, and government reports to summarize how premiums, plan quality, and enrollee health vary across different markets.

2.1 Survey data on enrollment by market

In this paper, I will use two principal datsets. First, I use the American Community Survey (ACS) because it has the largest sample and is available yearly. The two key downsides of the ACS are that (1) it does not have

[3] The small group market includes firms with up to 100 full-time employees in California, Colorado, New York, and Vermont.

good health status variables, and (2) it does not differentiate between on-exchange and “grandfathered” health insurance products after 2014. To account for these shortcomings, I also will perform some analyses with the Survey of Income and Program Participation (SIPP), which has a smaller sample but does have some basic data on health status and also reports participation in health insurance exchanges.

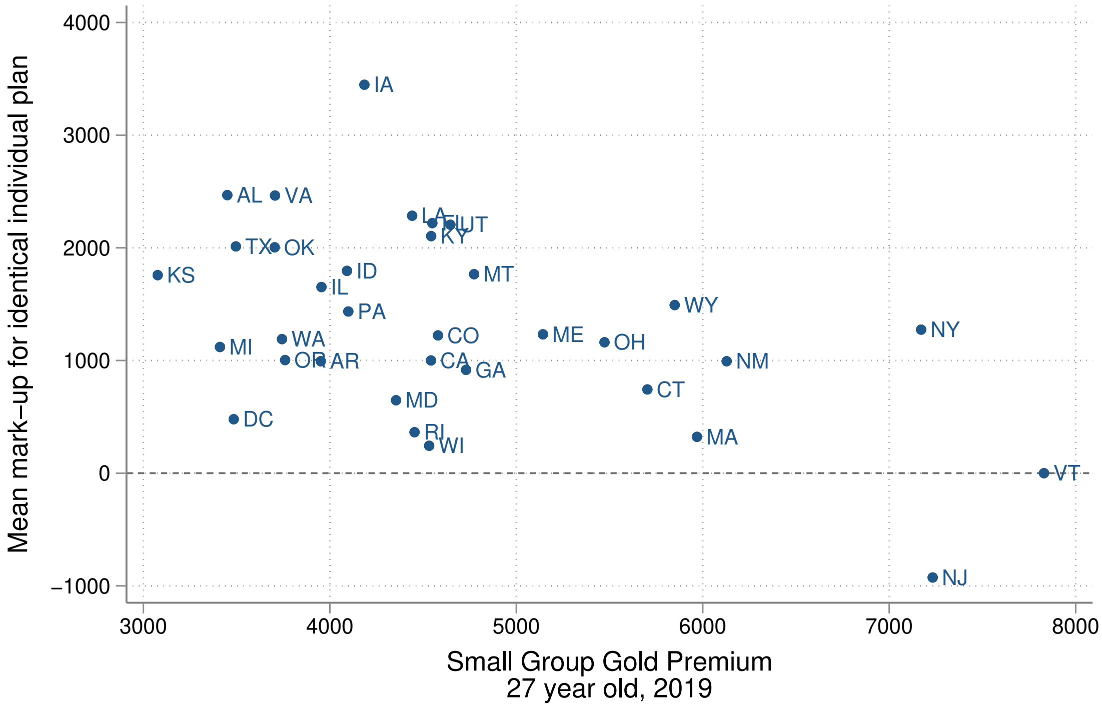
Two other surveys I considered but did not use are the Medical Expenditure Panel Survey - Household Component (MEPS-HC) and the Current Population Survey. MEPS-HC includes questions on all of the appropriate health insurance and health status variables. However, it has the smallest sample, and it does not include state identifiers in its public use microdata, making it unsuitable for this project. I chose not to use the Current Population Survey because it reports the same information as the ACS, but with a smaller sample (Note: this is not true for more recent years, because the CPS has started reporting enrollment in exchanges separately).

2.2 Plan Characteristics in the Individual Market: HIXCompare

The most accessible data on premiums and health insurance plan characteristics is that of the community-rated individual and small group markets which were set up by the Affordable Care Act. These markets include plans sold on and off health insurance exchanges. The raw data for these markets is available in the Health Insurance Exchange Public Use Files (for states which use Federally Facilitated Exchanges), and on state websites (for states operating their own exchanges). Data from state websites has been collected and standardized in the HIX Compare datasets (https://www.hixcompare.org), which were created by a partnership between the Robert Woods Johnson Foundation and Vericred. In this paper, I use the HIX Compare data for any plan-level comparisions in the individual and small group markets.

This data allows me to demonstrate how prices can differ across markets. Figure 3 that the sticker prices (which is the price before subsidies) for plans sold in the individual market are substantially higher than for identical plans sold in the small group market. To construct this figure, I identified all gold plans sold on the individual market where I can find a corresponding plan in the small group market with nearly identical characteristics. I then report the median difference in price across the individual and small group plans by state, and plot it against the average price of purchasing a gold plan as a small group. This figure shows that the price of an individual market plan is higher in nearly all states, except New Jersey. In states like Iowa, Alabama, and Virginia, an individual plan costs over 50% more than its identical counterpart in the small group market.

Figure 3: Relative Premium of Identical Plans in the Small Group and Individual Markets



Notes: Figure uses premium data from data compiled by HIX compare. Premiums are measured for a 27-year old with no subsidies. The x-axis reports the average premium of all gold plans available in the ACA compliant market both on and off exchange. The y-axis reports the median difference in price for near-identical individual and small group plans. Two plans are near-identical if they share an insurer, network, plan type (HMP/PPO, etc), metal tier, and geographic rating area. If an insurer offers multiple plans with these identical characteristics on the same market, I take the average premium across all of them. Plans are weighted such that each region has equal weight within a state.

2.3 Plan Characteristics in the Employer Market: MEPS-IC

The Medical Expenditure Panel Survey - Insurers Component is the largest survey of employer groups on their health insurance plans in the U.S. Performed yearly, this survey is large enough to identify trends in employer offer rates, premiums, and plan characteristics across differently sized employers at the state level. While there is no public-use microdata available, MEPS-IC publishes detailed statistics every year for each state in the U.S. In this study, I use MEPS-IC to track changes in employer health insurance offerings over time.

2.4 Spending and Enrollment Across All Markets: Medical Loss Ratio Data and CMS Marketplace Enrollment Data

I will document aggregate price differences across markets using the the Medical Loss Ratio (MLR) data, which is published by The Center for Consumer Information and Insurance Oversight of the Centers for Medicare and Medicaid Services. The reason for gathering and publishing this data is to track premium, enrollment, and health insurance claims across insurers and market segments, to ensure insurers are spending at least 80% or 85% of their revenues on medical services. This data enables me to calculate premiums paid and medical services consumed across states and market segments, in a way that is standardized across states and market segments. Moreover, between 2014 and 2016, insurers had to report separate estimates for individual market plans that were and that were not eligible to receive Medical Loss Ratio payments. This allows me to track premiums and claims across all ACA compliant and grandfathered plans (as opposed to just plans sold on health insurance exchanges).

A closely related data source is the CMS Marketplace Enrollment Data, which CMS occasionally publishes in a short report titled "Trends in Subsidized and Unsubsidized Enrollment."[4] This publication uses risk adjustment data and effectuated enrollment data to track enrollment in community rated markets both on and off exchange. The key benefit of the CMS marketplace enrollment data is the ability to differentiate between subsidized and unsubsidized enrollees on the individual ACA exchanges, as well as tracking community-rated enrollment after 2017.

3 Cross-Market Effects of Price Changes in the Individual Market

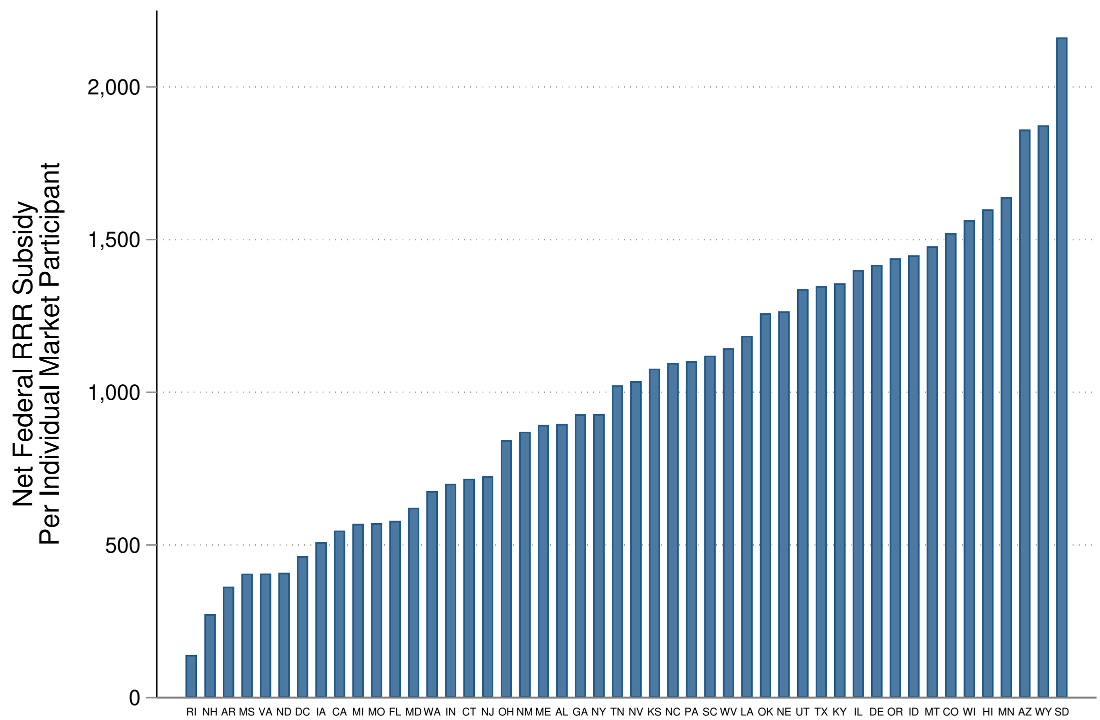
Since the enactment of the Affordable Care Act in 2014, average prices on individual health insurance exchanges have varied widely both over time and across different states in the U.S. One of the biggest causes of this price variation are the reinsurance and risk corridor programs. These two temporary programs were included in the Affordable Care Act to help stabilize prices for new community-rated individual plans, which are called "ACA compliant plans."[5] Because the timing of the phase out of these programs was arbitrary and their effect on the individual market was large, I will use them as an instrument for price changes in the individual market, to show how these price changes can potentially spill over to other health insurance markets and to the labor market.

[4] See for example https://www.cms.gov/CCIIO/Resources/Forms-Reports-and-Other-Resources/Downloads/Trends-Subsidized-Unsubsidized-Enrollment-BY18-19.pdf

[5] The ACA also contained a provision for risk adjustment, which unlike reinsurance and risk corridors was designed to be permanent. The risk adjustment program is revenue neutral and only transfers funds across plans within a given state, and so does not affect these cross-state results.

Together, the promised reinsurance and risk corridor payments were very important to insurer revenues.[6] The reinsurance program provided additional funding to reimburse plans for individuals with medical costs above $45,000 per year. This program had a budget of $10 billion in 2014, $6 billion in 2015, and $4 billion in 2016. The risk corridor program acted as a transfer policy from more profitable to less profitable plans. Plans with claims-to-premiums ratios under 77.6% paid into a fund which reimbursed plans with claims-to-premiums ratios of over 82.4%. By law, there was no guarantee that risk corridor payments should sum to zero, and in practice claims were 8 times higher than payments into the program in 2014.[7] In total, promised payments (net of contributions) in 2015 for ACA compliant plans on the individual market were 12 billion dollars, which represented 19% of the total amount spent by insurers on medical care that year.

Figure 4: Reinsurance and Risk Corridor Subsidies by State



Notes: This figure reports net reinsurance and risk corridor payments per enrollee-year by state in 2015.
Source: Author caculations base on the Medical Loss Ratio data, published by The Center for Consumer Information and Insurance Oversight of the Centers for Medicare and Medicaid Services.

While the rules governing the reinsurance and risk corridor programs were the same in all states, certain states benefited much more than others. Figure 4 shows that, in 2015, the average promised payment per

[6]For more details about these programs, see the healthinsurance.org explainer "The ACA's cost-sharing subsidies" at https://www.healthinsurance.org/obamacare/the-acas-cost-sharing-subsidies/

[7]Note: The 2015 and 2016 appropriations bills required that payments not exceed collections from the risk corridor program. As a result, actual payments were lower than anticipated payments. I discuss the impacts of this policy change for premiums in 2016 later in this section.

individual market enrollee varied between $140 in Rhode Island to $2162 in South Dakota. The relative ranking of states is highly persistent between 2014-2016: The correlation of promised payments per enrollee in 2014 and promised payments promised payments per enrollee in 2015 is .80. This cross-state variation is not random. States which enrolled a higher risk population had higher payments, and states with higher individual market prices in 2014-2015 had lower payments. However, these payments are only weakly related to variables like political partisanship. Moreover, while states which expanded Medicaid received less payments on average, there remains large variation in average payments made in both expansion and non-expansion states.

This paper will use the arbitrary phase-out date subsidies after 2016 to identify the effect of subsidies on individual market prices, and in turn the effect of prices on enrollment by market. To interpret the effects of price changes as causal requires the assumption that there were no other coincident changes which were correlated with reinsurance and risk corridor payments. Because of the sheer size of these programs, any omitted variable bias would also need to be large to change either the sign or magnitude of measured results. I thus will now briefly describe other major changes in health insurance markets over this period, and how I expect these could affect prices and enrollment in health insurance markets.

The first potential confounding factor comes from Congress declining to fully fund the risk corridor program starting in 2015. According to the original text of the Affordable Care Act, there was no guarantee that payments and revenues of the risk corridor program should sum to zero. However, in the 2015 and 2016 appropriations bills, Congress stipulated that payments must be no greater than costs, and that there would be no additional funding appropriated to the risk corridor program. Insurers challenged this provision, and the Supreme Court ruled in *Maine Community Health Options v. United States* that the federal government was liable for the full amount of risk corridor payments. This budgetary maneuver likely had no effect on premiums in 2015, because the provision was added to the budget near the end of budget negotiations and months after insurers had set their premiums for 2015.[8] However, insurers likely assumed they would not receive timely risk corridor payments for the 2016 plan year, and would have set prices accordingly. As a result, I will treat 2015 as the last year insurers expected full risk corridor payments, and will measure price changes for ACA compliant plans starting in 2016.

A second potential confounding factor is the elimination of funding for cost sharing subsidies by the Trump administration, which affected plans offered starting in 2018. This action left insurers with revenue shortfalls. In response, some state governments encouraged insurance companies to perform “silver loading,” which allowed price increases only for affected silver plans while leaving bronze and gold plans unaffected.

[8] I could find no media mention suggesting this could happen, suggesting that this provision caught market participants by surprise.

Other states did not allow insurers to use silver loading, and so insurers in these states raised the price of all plans on the individual market. While these state actions are only weakly correlated to reinsurance and risk corridor payments, these state actions became the most important driving force behind premium changes starting in 2018. Moreover, these decisions implied substantial changes to the relative price of plans of different metals across states.

In the sections that follow, I will use the phase-out of reinsurance and risk corridor programs by state instrument for premium changes as these programs were phased out. I expect premium changes to partially occur between 2015 and 2016, and for them to be fully realized by 2017. I further expect outcomes to become more noisy in 2018 when Trump administration policies start having substantial effects individual health insurance exchanges. For some specifications, I will also be including pre-trends that extend back before 2014. In these regressions, I expect there may also be a trend break in 2014, the date the Affordable Care Act was enacted, along with the reinsurance and risk corridor programs. Because the rules governing the individual market were so different prior to 2014, there is no reason to expect the trend break in 2017 should be equal and opposite to a potential trend break in 2014.

3.1 First Stage: Effect on Premiums

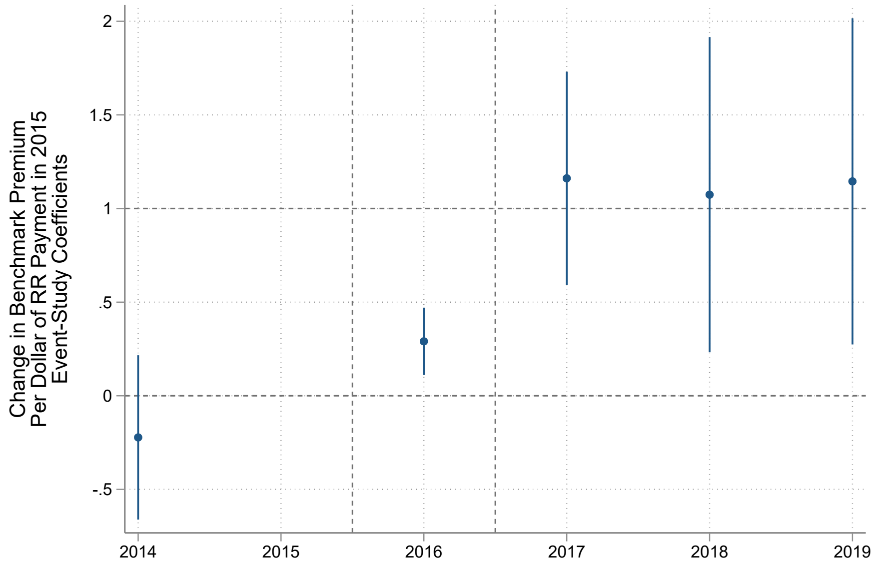
To measure the effect of the phase-out of the reinsurance and risk corridor program on premiums, I estimate equation (1), a parametric event-study. In this regression, the dependent variable, Y_{st}, is a measure of the average premium on the individual market in state s at time t. My core specification uses the average benchmark premium[9] to measure Y_{it} and in robustness checks I will report other ways of calculating average premiums. The key dependent variable, R_s^{2015}, measures the the average reinsurance and risk corridor subsidy per person for state s in 2015, which I calculate using regulatory submissions by insurers reported in the Medical Loss Ratio Data, published by The Center for Consumer Information and Insurance Oversight of the Centers for Medicare and Medicaid Services. I also include state fixed effects α_s and year fixed effects γ_t.

$$Y_{st} = \beta_t R_s^{2015} + \alpha_s + \gamma_t + \epsilon_{st} \tag{1}$$

The sample for this and all subsequent regressions in this section includes all the states in the contiguous United States except Massachusetts and Vermont, which both operate a joint individual/small group

[9] Benchmark premiums are defined by law to be the cost of the second lowest-cost silver plan on individual health insurance exchanges. In my core specification, I use the estimates of the population-weighted average benchmark premium as calculated by the Kaiser Family Foundation (https://www.kff.org/health-reform/state-indicator/marketplace-average-benchmark-premiums)

Figure 5: Individual Market Benchmark Premium vs. 2015 Reinsurance and Risk Corridor Payments



Notes: This figure report coefficients β_t from equation (1), which are measures of the pass-through of reinsurance and risk corridor subsidies to premiums in the individual market. A coefficient of 1 in 2017 would imply that premiums rose $1 in 2017 for each $1 of reinsurance and risk corridor payments which were phased out between 2016-2017. The dependent variable is the average premium of a benchmark plan purchased by a 40-year old at the State-level. Reinsurance and Risk Corridor Payments are calculated by the author using Medical Loss Ratio data, published by The Center for Consumer Information and Insurance Oversight of the Centers for Medicare and Medicaid Services. The sample includes all states in the continental United States except Massachusetts and Vermont.

market.[10] Unless otherwise noted, states are given equal weights in the regressions that follow, and I cluster standard errors at the state level.

Results from equation (1) are reported in figure 5 and the coefficients are reported in column 1 of table 1. The point estimate of 1.16 in 2017 suggests that, for every $1.00 of reinsurance and risk corridor payments that was withdrawn from a state, the average benchmark premium for a 40-year old person rose by $1.16. Because prices vary according to a 3:1 age curve, a $1.16 price for a 40-year old is equivalent to a $.91 price increase for a 21 year old, and a $2.73 price increase for a 64-year old.

Because results using the benchmark premium are just one of many ways to summarizes the price of coverage on the individual market, I also supplement these results with a specification that tracks price changes across all health insurance plans sold on the individual market. To identify the effects of the removal of subsidies, I track how prices change for plans with the same characteristics that are sold multiple years in a row using equation (2).

[10]Note: All results in this section are qualitatively similar if I also include Alaska, Hawaii, and the District of Columbia, but point estimates are much noisier, mainly because Alaska is such a huge outlier with respect to the price of health insurance.

$$log(Y_{irt}) = \beta_t \tilde{R}^{2015}_{s(r)} + \alpha_{s(r)} + \delta_{g(i),r} + \gamma_t + \epsilon_{st} \quad (2)$$

The unit of observation in equation (2) is a health insurance plan i, sold in region r and state $s(r)$ at time t. Y_{irt} is premium of this plan. $\tilde{R}_s = log\left(\frac{\bar{y}_s + R_s}{y_s}\right)$ is the log transformed reinsurance and risk corridor payment in state s, normalized by the $\bar{y}_s$, which is the average premium paid across all plays in state s. Since $\tilde{R}_s$ is the predicted log change in premiums from a 1-to-1 pass-through, coefficients β_t measure the actual pass-through of these payments to premiums. The sample includes all community-rated bronze, silver, and gold individual market plans sold on or off exchange. Each plan i is weighted so that gold, silver and bronze plans each have equal weight in a region, each region has equal weight within a state, and each state has equal weight in the overall regression.

To control for potential changes in plan quality, I combine plans into groupings $g(i)$, that contain plans with similar characteristics and measure premium changes only within a grouping-region pair. In constructing the groupings $g(i)$ there is a trade-off: Broader groupings allow for a more complete sample, but smaller groupings group together more similar plans. To get the best of both of these advantages, I include three different grouping specifications. The broadest grouping, which includes all plans in the data,[11] groups plan only by metal tier and region. The second broadest grouping groups plans by carrier and metal tier, and so is identified only with carriers that participate for more than one year on the exchange. The smallest grouping groups only plans that share the exact carrier and name, which should track plans that have nearly identical characteristics across years. In reporting results, I only include plans in the sample which are used for identification because they are part of a group which exists for more than one year.

I report results in table 1. In this figure, columns (1) and (2) show coefficients from a equation (2), which uses state average benchmark premiums as the dependent variable. Columns (3)-(5) show regressions which include all in-sample plans sold on the individual market. While point estimates differ, all 5 specifications tell a similar qualitative story. As RR payments are phased out, prices rise roughly in step with the reduction in payments. The partial phase-out of payments in 2016 generated a partial increase in prices, and coefficients hover around 1 in 2017, suggesting price increased roughly 1-for-1 for each reduction in RR payments. These price increases persist in 2018 and 2019, though the magnitude and statistical significance of the relationship is less strong.

These specifications do differ quite markedly on their exact point estimates. For example, the pass-through rate in 2017 was estimated to be as low as .759 and as high as 1.475. Theory would predict a pass-through rate of greater than 1, because we should expect some movement along the average cost curve

[11] With the small exception of 1700 plans that are dropped because of changes to region boundaries

Table 1: Individual Market Premiums vs. 2015 Reinsurance and Risk Corridor Payments

	Benchmark Premium		Plan-Level Premiums		
	(1)	(2)	(3)	(4)	(5)
	Dollars	Log-Log	Log-Log	Log-Log	Log-Log
RR Payment*2014	-0.222	-0.270	-0.155	0.0139	-0.496*
	(0.218)	(0.247)	(0.243)	(0.251)	(0.222)
RR Payment*2016	0.291**	0.437**	0.259***	0.396***	-0.165
	(0.0893)	(0.127)	(0.0609)	(0.0730)	(0.192)
RR Payment*2017	1.161***	1.475***	1.049***	1.143***	0.759**
	(0.283)	(0.307)	(0.166)	(0.151)	(0.229)
RR Payment*2018	1.074*	1.112**	0.606*	0.800***	0.503*
	(0.418)	(0.348)	(0.232)	(0.176)	(0.248)
RR Payment*2019	1.145*	1.115**	0.697**	0.829***	0.572*
	(0.432)	(0.339)	(0.203)	(0.167)	(0.244)
Constant	3400.1***	8.122***	8.217***	8.188***	8.255***
	(264.7)	(0.0600)	(0.0616)	(0.0599)	(0.0539)
Year FE	Yes	Yes	Yes	Yes	Yes
State FE	Yes	Yes	No	No	No
Metal*Area FE	No	No	Yes	No	No
Metal*Area*Carrier FE	No	No	No	Yes	No
Plan Name*Area FE	No	No	No	No	Yes
Observations	265	265	156209	137343	61797
Number of States	46	46	46	46	46
State-Years	265	265	264	264	253

Standard errors in parentheses

+ $p < .10$, * $p < .05$, ** $p < .01$, *** $p < .001$

Notes: This table shows 5 different measures of the pass-through of the phase-out of reinsurance and risk corridor subsidies to premiums in the individual market. Column 1 reports coefficients β_t from equation (1), and is an exact replication of figure 5. Column (2) estimates equation (1) substituting $log(Y_{st})$ for Y_{st} and $\tilde{R}_s^{2015}$ for R_s^{2015}. Columns (3), (4), and (5) estimate are coefficients β_t from equation (2) with varying controls. Column (3) includes fixed effects for geographic region interacted with the metal tier of the plan. Column (4) includes fixed effects for region interacted with metal tier and carrier. Column (5) includes fixed effects for region interacted with carrier and exact plan name. Data for columns 1-2 is the same as in figure 5. Plan-level data is from the HIX Compare dataset.

to higher cost patients as lower cost individuals leave the individual market (see section 1.1). However, we could also expect to measure a lower pass-through rate if insurers facing larger changes in payments alter unobserved features of plans to make them worse.

Since the individual market prices only exist starting in 2014, there is not a long pre-trend to analyze in this state-level regression. If anything, high RR payments in 2015 are associated with lower prices in 2014, though it is only statistically significant in one specification. These point estimates are consistent with the fact that RR payments were highly correlated between 2014 and 2015 but total reinsurance payments were lower in 2015.

3.2 Impact of Premium Changes on Enrollment and Employment

Now, I will use the price changes predicted by reductions in RR payments to track enrollment and selection across all markets in the U.S. For this, I will be using two separate specifications. First, I will estimate equation (1), substituting enrollment as the dependent variable. Since the pass-through of RR payments to premiums is on the order of 1-for-1 (see figure 5), this approach should yield a very similar estimate as an IV approach. Then, to summarize the effect of premiums on enrollment in a single coefficient, I will also use a traditional IV framework. In a two-step least squares regression, I use equation (3) as the reduced-form regression.

$$Y_{st} = \beta P_{st} + \alpha_s + \gamma_t + \epsilon_{st} \tag{3}$$

And, the first-stage regression is stated in equation (4):

$$P_{st} = \delta_t R_s^{2015} + \alpha_s + \gamma_t + \epsilon_{st} \tag{4}$$

When estimating these regressions, I will use average benchmark premium by state as a measure of P_{st}. I estimate all regressions using data from 2014-2018 using two-stage least squares, and I cluster standard errors at the state level.

Table 2: Individual Market Enrollment vs. 2015 Reinsurance and Risk Corridor Payments

	ACA Compliant Individual Plans			All Individual Plans
	(1)	(2)	(3)	(4)
	All Plans	With APTC	No APTC	All Plans
RR Payment in Thousands X 2014	0.0215	-0.0651	0.0865	0.245
	(0.262)	(0.166)	(0.227)	(0.211)
RR Payment in Thousands X 2016	-0.365	0.144	-0.509^{+}	-0.445
	(0.305)	(0.0857)	(0.294)	(0.311)
RR Payment in Thousands X 2017	-0.761^{+}	0.294^{*}	-1.056^{**}	-0.761^{*}
	(0.407)	(0.122)	(0.387)	(0.331)
RR Payment in Thousands X 2018	-0.647^{+}	0.249	-0.896^{**}	-0.711
	(0.373)	(0.153)	(0.329)	(0.428)
2015 Mean	4.350	2.248	2.102	5.352
Observations	230	230	230	230

Standard errors in parentheses

$^{+}$ $p < .10$, * $p < .05$, ** $p < .01$, *** $p < .001$

Notes: This table shows the relationship between reinsurance and risk corridor payments in the individual market and enrollment in these markets. Each column reports coefficients β_t from equation (1) with a different measurement of individual market enrolment as the dependent variable. Columns (1)-(3) measure enrollment in ACA compliant individual plans (including plans with and without advanced premium tax credits) using CMS enrollment data. Column data reports enrollment in all individual plans using Medical Loss Ratio data.

Results of the parametric event-study specification on enrollment in the individual market are listed in table 2. In this table, coefficients measure the effect of a $1000 increase in RR payments on enrollment as a fraction of the state population. In columns (1) to (3) I report effects on ACA compliant individual plans, both with and without advanced premium tax credits. In column 4, I report results for all individual plans, which includes grandfathered individual plans.

These results suggest that premium increases had a massive (though only barely statistically significant) impact on enrollment. For example, a state with $1000 more in reinsurance and risk corridor payments in 2015 had lower enrollment as a fraction of the population of 1.056%. Since the population of enrollees not receiving APTC payments in 2015 was only 2.1%, this effect size represents *half* of the average population not receiving APTC payments on exchanges in 2015. The reduction in unsubsidized enrollment was partially made up for with an increase in enrollment among individuals receiving APTC payments. This increase could come from two sources: Individuals becoming eligible for subsidies as prices rise (since the income cutoff rises as benchmark premiums increases), or from individuals changing their behavior to become eligible for APTC payments when prices rose.

Next, I estimate enrollment in other health insurance markets in table 3. This table reports enrollment by market using three different data sources. In the first four rows, I reproduce the parametric event study results on individual market enrollment using IV. As expected, the coefficients are very similar to the coefficients in table 3 in 2017, because the first-stage relationship between RR payments and benchmark premiums is close to 1-for-1. Finally, I report the results for all other sources of private coverage in the later rows. Unfortunately, in the state-level regressions, I am under-powered to say very much with regard to substitution towards other types of private coverage.

As a second measure of the effects of RR payments, I also estimate this IV using data from the American Community Survey Public-Use Microdata Sample. My sample is adults aged 26-64. Moreover, since individuals earning under 400% of the federal poverty level have access to subsidies (and therefore are not fully subject to price increases on the individual exchange), I also show results restricting the sample to individuals earning over 400% of the federal poverty level. I use sampling weights and cluster standard errors by state. Results from this parametric event study are listed in Table 4. Consistent with all other datasources, individual market enrollment falls precipitously when premiums increase. Most of the individuals leaving the individual market appear to stop receiving insurance. However, among those earning over 400% of the Federal Poverty Level, it appears that enrollment in the employer-sponsored insurance market rose one-for-one with a drop in enrollment on the individual exchanges. There is no statistically significant effect on employment status of workers or earnings, though these state-level regressions also suffer from low power.

Table 3: Effect of Changes in Benchmark Premiums on Enrollment and Employer Offer Rates

	(1) RF	(2) IV
CMS Enrollment		
Individual, ACA Compliant	-0.132	-0.557*
	(0.0873)	(0.281)
... With Premium Tax Credits	0.154**	0.239*
	(0.0445)	(0.116)
... No Premium Tax Credits	-0.286***	-0.796*
	(0.0731)	(0.263)
Medical Loss Ratio Enrollment		
Individual, All	-0.263*	-0.671*
	(0.0857)	(0.268)
Employer, All	-0.849	-0.899
	(0.851)	(2.013)
... Small Employers	0.0154	0.0465
	(0.0880)	(0.189)
... Large Employers	-0.0768	-0.115
	(0.109)	(0.272)
... Self-Insured Employers	-0.787	-0.830
	(0.813)	(1.922)
MEPS-IC Employer Survey Enrollment		
Pct Employees Enrolleed	0.130	0.810
	(0.294)	(0.565)
Pct Establishments Offering Insurance	0.110	-0.464
	(0.320)	(0.619)
Pct Employees at Establishments Offering Insurance	0.366+	-0.0134
	(0.222)	(0.496)
Pct Employees Eligible	0.130	1.277*
	(0.270)	(0.626)
Pct Take-up Among Eligible Employees	-0.210	0.0721
	(0.224)	(0.544)
Observations	230	230

Standard errors in parentheses

+ $p < .10$, * $p < .05$, ** $p < .001$, *** $p < .0001$

Notes: This table shows reduced form and IV estimates of equation (4) using outcomes measured in the CMS Enrollment data, the MLR data, and MEPS-IC. In all cases, the coefficients are scaled to represent the change in enrollment in percentage points (as a fraction of state population except where otherwise noted) per $1000 change in benchmark premiums.

Table 4: Effect of Changes in Benchmark Premiums on Enrollment and Employer Offer Rates

	Full Sample		FPL > 4	
	(1)	(2)	(3)	(4)
	RF	IV	RF	IV
Individual Insurance	-0.269***	-0.588**	-0.308***	-0.804***
	(0.0658)	(0.195)	(0.0806)	(0.195)
Employer-Sponsored	0.0115	0.0673	0.272**	0.728***
	(0.111)	(0.264)	(0.0878)	(0.181)
Medicaid	-0.213+	-0.423	-0.0964*	-0.206
	(0.119)	(0.432)	(0.0388)	(0.146)
Uninsured	0.396**	0.942+	0.124*	0.260
	(0.136)	(0.530)	(0.0502)	(0.177)
Is a Worker	-0.0519	-0.271	0.0575	0.142
	(0.0839)	(0.266)	(0.0415)	(0.119)
Full-Time Worker	-0.0991	-0.458	-0.0253	-0.0381
	(0.0914)	(0.291)	(0.0562)	(0.162)
Part-Time Worker	0.0212	0.121	0.0322	0.0773
	(0.0391)	(0.106)	(0.0302)	(0.109)
Self-Employed Worker	0.00962	0.0484	-0.0125	0.0534
	(0.0194)	(0.0615)	(0.0351)	(0.0811)
FPL Over 400% of FPL	-0.194+	-0.242		
	(0.112)	(0.321)		
N	7541939	7541939	3269133	3269133

Standard errors in parentheses

$^{+}$ $p < .10$, * $p < .05$, ** $p < .01$, *** $p < .001$

Notes: This table shows reduced form and IV estimates of equation (4) using outcomes measured in the American Community Survey. In all cases, the coefficients are scaled to represent the change in enrollment in percentage points (as a fraction of state population except where otherwise noted) per $1000 change in benchmark premiums. Columns (1) and (2) report results for the full population aged 26 to 64, and columns 3-4 restrict the data to individuals with incomes above 400% of the Federal Poverty Level.

4 Medicaid Expansion's Effect on the Individual Market

A central goal of the Affordable Care Act (ACA) was to increase the number of people covered by health insurance. For low-income individuals (those earning under 138% of the federal poverty level) the ACA did so by expanding Medicaid eligibility. The ACA also created individual health insurance exchanges, which were meant for those who earn above 138% of the federal poverty level.

While Medicaid expansion was designed to be enacted nationally, the planned Medicaid expansion was not actually enacted in all states. In the case *National Federation of Independent Business v. Sebelius*, the Supreme Court decided in June of 2012 that the federal government could not compel states to expand their Medicaid programs. As a result, 23 states decided to not expand Medicaid. In non-expansion states, many individuals that would have been eligible for Medicaid chose to purchase insurance on health insurance exchanges instead. This was especially appealing to individuals whose income was between 100 and 138% of the Federal Poverty Line, who were eligible for generous premium tax credits. In non-expansion states, no provision in the Affordable Care Act provides subsidized health insurance for those earning less than 100% of the federal poverty level.

4.1 Adverse Selection Across Expansion and Non-Expansion States

In this section, I find that selection into Medicaid plays an important role in setting prices on the individual health insurance exchanges.

Table 5: Characteristics of ACA Individual Market, ACA Expansion and Non-Expansion States

	Full Population		Exchange Enrollees	
	Expansion States	Non-Expansion States	Expansion States	Non-Expansion States
Age	31.2	31.2	39.7	39.8
Female	0.51	0.52	0.52	0.57
Under 133% of FPL	0.27	0.29	0.20	0.30
Under 200% of FPL	0.40	0.43	0.39	0.46
Under 400% of FPL	0.67	0.71	0.75	0.78
Excellent Health	0.37	0.36	0.34	0.34
Very Good Health	0.30	0.29	0.32	0.25
Good Health	0.22	0.22	0.23	0.28
Fair Health	0.080	0.092	0.071	0.10
Poor Health	0.031	0.034	0.032	0.023
Fraction of Population			0.017	0.025
Sample Size in SIPP	37651	22322	631	557

Notes: This table provides summary statistics from the Survey of Income and Program Participation on average income and health status of enrollees in health insurance exchanges and the overall population in expansion and non-expansion states.

To test for adverse selection, I first measure characteristics of individuals purchasing health insurance

Table 6: Average Enrollment, Claims, and Premiums Across Markets

	Medicaid Expansion States			Non-Expansion States		
	(1)	(2)	(3)	(4)	(5)	(6)
	2013	2014	2015	2013	2014	2015
Enrollment, Percentage of Population						
Individual, All	2.86	3.95	4.60	3.54	5.12	6.04
Individual, ACA Compliant	.	2.47	3.87	.	2.62	4.67
... With Premium Tax Credits	.	0.99	1.50	.	1.64	2.97
... No Premium Tax Credits	.	1.48	2.36	.	0.98	1.71
Individual Grandfathered	2.86	1.66	1.05	3.54	2.70	1.65
Employer, All	37.2	35.7	35.5	28.3	28.4	28.5
... Large Employers	16.8	15.7	15.2	9.69	9.14	9.31
... Small Employers	5.74	5.23	4.76	4.44	4.25	3.79
... Self-Insured Employers	14.6	14.9	15.6	14.2	15.0	15.4
Claims Per Enrolled Member						
Individual, All	2975.2	3993.0	4460.6	2324.0	3843.4	4604.9
Individual, ACA Compliant	.	4633.9	4728.8	.	5239.9	5215.5
Individual, Grandfathered	2975.2	3331.4	3796.2	.	2584.3	2870.7
Small Employer	3714.2	3816.8	3964.6	3382.7	3467.2	3727.1
Large Employer	3980.5	4167.0	4341.3	4020.7	4171.8	4282.1
Premiums Per Enrolled Member						
Individual, All	3376.4	3901.9	4153.3	2806.2	3508.8	3992.8
Individual, ACA Compliant	.	4140.8	4214.0	.	4133.8	4183.9
Individual, Grandfathered	.	3665.4	4132.5	.	2914.0	3481.2
Small Employer	4546.1	4760.3	5000.5	4221.7	4257.8	4616.9
Large Employer	4567.5	4871.2	5070.4	4529.8	4868.5	4881.3
Observations	27	27	27	19	19	19

Notes: This table provides summary statistics on enrollment, claims, and premiums in different private health insurance markets in expansion and non-expansion states between 2013-2015. Source:Medical Loss Ratio data, published by The Center for Consumer Information and Insurance Oversight of the Centers for Medicare and Medicaid Services.

in expansion and non-expansion states. I use the Survey of Income and Program Participation, because it is the best available public-use data that is available at the state level and also distinguishes between participants on health insurance exchanges from the general population. I find that non-expansion states have a population that is poorer, more female, and more likely to report being in "fair" or "poor" health. All three of these variables are correlated to higher health insurance payments.

Next, I track how average medical claims vary across market segments and over time. I measure total claims per enrolled member, which is the amount paid by insurance companies for all medical services (including from hospitals and physicians) and prescription drugs. The idea is that, if a market enrolls an adversely selected population, total claims in that market will increase. Adverse selection is not the only reason claims could vary across markets. For example, markets with more generous insurance or that insure patients in areas with more expensive hospitals, could have higher claims per member.

I measure claims using the Medical Loss Ratio data, which includes aggregate premiums, enrollment, and health spending by state, insurance company, and market segment. I aggregate total claims per insured person by market to the state level, and report results in Table 6. This figure shows that spending per member in non-expansion states on their ACA compliant individual market was ending per member is \$606 lower (13%) in expansion relative to non-expansion states in 2014, and \$487 (10.3%) lower in 2015. This is despite the fact that expansion states have either similar or higher cost insurance in every other market. These higher costs are not reflected in higher premiums in 2014 and 2015, though that is almost certainly because of higher reinsurance and risk corridor payments in non expansion states during this period.

4.2 Cross-Market Selection at the Plan Level

To estimate the degree of adverse selection in each individual market, I take advantage of the fact that the Affordable Care Act created separate individual and small group markets for health insurance. The individual and small group markets operate in separate risk pools, but share most regulations on plan quality and pricing. The same insurers tend to participate in both markets, and similar (often identical) plans are offered. As a result, the difference in premiums is a useful proxy for how adversely selected the individual market is in each state.

Let $P_{j,t,g,m}$ be the premium for plan j in year t at location s and in market m, where m is either "Individual ACA" or "Small Group ACA." I then estimate the regression:

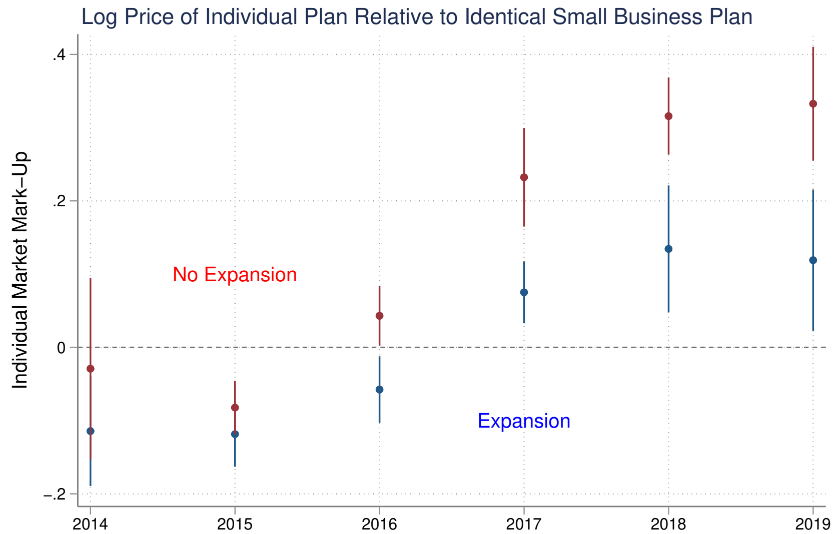
$$\begin{aligned} log(P_{j,t,g,m}) = {} & \beta_t 1\{m = \text{Individual ACA}, g \in \text{Non-Expansion State}\} \\ & + \delta_t 1\{m = \text{Individual ACA}, g \in \text{Expansion State}\} \\ & + \psi_{t,g,m} + \epsilon_{j,t,g,m} \end{aligned} \tag{5}$$

In this equation, $\psi_{t,g,m}$ is a separate fixed effect for the interaction of plan,[12] geographic rating area, and year. β_t is thus an estimate of the average difference in prices between a individual and small group plan in a non-expansion state, and δ_t is an estimate from an expansion state. This regression is weighted so each state has equal weight, and standard errors clustered at the state level. Results are reported in Figures 6 and 7

In Figure 6, I report coefficient estimates from Equation (5) using the sticker price of insurance purchased by a 40-year old individual. This figure shows clearly that prices in the individual market were actually lower than in the small group market in 2014 and 2015. The reason prices were lower was that the individual

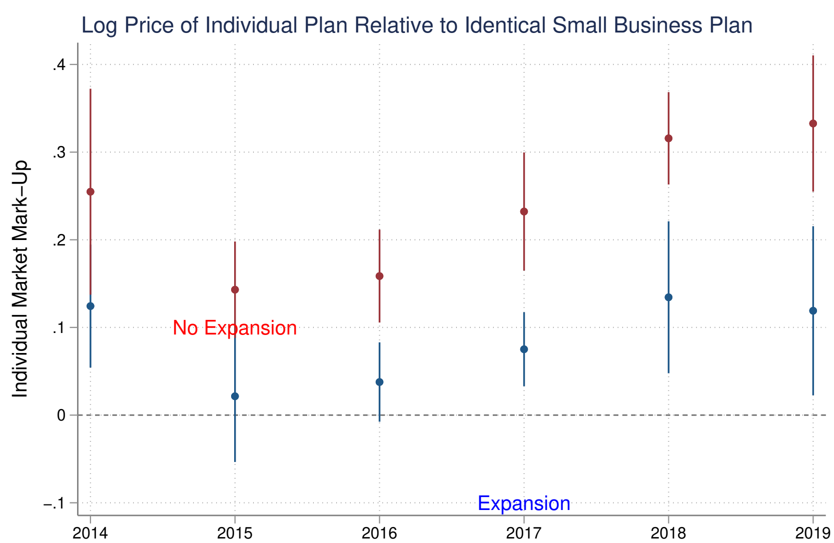
[12] Note that, while insurance companies often offer near-identical plans in both the individual and small group markets, there are often minor differences in the plans offered. In the primary specification, all products of a given metal tier, insurer, and product type (HMO/PPO/POS) are lumped together as the same plan. I have run these results using more stringent definitions of plan (eg: Shares all characteristics in the data as identical). When I do this, the sample size drops, but the qualitative and quantitative results are robust.

Figure 6: Log Price of Individual Plan Relative to Small Group Plan (Raw)



This table plots regression coefficients from Equation (5). The dependent variable is the log price of a plan purchased by a 40-year old. The unit of observation is at the plan/rating area level, and the sample includes all plans of all metal tiers except catastrophic plans. The sample only includes plans which are sold in both the individual and small group markets. Two different products are the same "plan" if they share an insurer, network, network type (PPO or HMO), and metal tier. Regressions are weighted so each state has equal weight in the regression and standard errors are clustered at the state level.

Figure 7: Log Price of Individual Plan Relative to Small Group Plan (Adjusted for Subsidies)



Coefficients are from Equation (5). All notes are the same except as Figure 6 except that the dependent variable is adjusted prices. Adjusted prices are calculated by multiplying the sticker price by the an inflation index, equal to $\frac{1}{1-subsidy}$, where the subsidy is calculated as the net combined expected risk corridor and reinsurance subsidies as a fraction of premiums reported in the Medical Loss Ratio files by market and state in 2014-2016.

market received large risk adjustment and risk corridor subsidies relative to the small group market in 2014-2016 (and especially 2014-2015). To get a better measure of adverse selection, I also calculate a measure of adjusted premiums by adding back anticipated subsidies, which I take from the Medical Loss Ratio data. This measure of adjusted premiums represents the total price paid for each health insurance product, including both premiums paid by individuals and subsidies paid by the government. Results for adjusted premiums are listed in Figure 7.

These regressions suggest that the individual market has always been adversely selected relative to the small firm market. In expansion states, premiums plus subsidies in the individual market have fluctuated between 5 and 15 log points higher than in the small group market. In non-expansion states, premiums plus subsidies have been between 15 and 35 log points higher. Average premiums paid by consumers were held artificially low between 2014-2016 because of temporary risk corridor and reinsurance subsidies, and the price paid by consumers was similar across expansion and non-expansion markets. Since 2016, prices rose in all markets, and rose more drastically in non-expansion states.

As a result, the passage of the Affordable Care Act actually acted in two satages. Medicaid expansion and the individual health insurance exchanges were enacted in 2014. In 2014-2016, the the risk profile of populations in health insurance exchanges differed between expansion and non-expansion states, but prices were relatively similar. Once the risk adjustment and risk corridor subsidies were removed, then a substantial price difference became apparent between expansion and non-expansion states. This price difference contributed to a widening of the gap in insurance coverage between expansion and non-expansion states over time.

5 Conclusion

In this study, I present a framework which shows how different eligibility conditions across health insurance markets can lead to differences in the price of insurance in these markets. I show that these price differences can be very large in practice: For example, in Tennessee in 2018, purchasing a plan in the individual market is over 70% more expensive than an equivalent plan in the small firm market. Then, I show that policies which affect one market can spill over to other markets through risk sorting.

These findings are very important to consider as politicians debate different policies to expand health insurance access in the United States. As of 2019, 9.2% of the the United States population still does not have health insurance.[13] However, there is strong support in Congress for preserving existing health insurance

[13] Source: American Community Survey

options, because many who are currently insured report they are satisfied with their existing plan.[14] As a result, it seems likely that even if the rules governing insurance markets change, the existing system of multiple competing markets will stay for the foreseeable future. Understanding how this system affects the distribution of what people pay for coverage and how policy affects this distribution is thus important.

[14]Medicaid: https://jamanetwork.com/journals/jamainternalmedicine/fullarticle/2643347 Employer-sponsored: http://files.kff.org/attachment/Report-KFF-LA-Times-Survey-of-Adults-with-Employer-Sponsored-Health-Insurance

References

Akerlof, George. 1970. "The market for 'lemons': Quality uncertainty and the market mechanism." *The Quarterly Journal of Economics*, 84(3): 488–500.

Azevedo, Eduardo M., and Daniel Gottlieb. 2017. "Perfect Competition in Markets With Adverse Selection." *Econometrica*, 85(1): 67–105.

Bundorf, M. Kate, Jonathan Levin, and Neale Mahoney. 2012. "Pricing and Welfare in Health Plan Choice." *American Economic Review*, 102(7): 3214–48.

Clemens, Jeffrey. 2015. "Regulatory Redistribution in the Market for Health Insurance." *American Economic Journal: Applied Economics*, 7(2): 109–34.

Cutler, David M., and Jonathan Gruber. 1996. "Does Public Insurance Crowd out Private Insurance?" *The Quarterly Journal of Economics*, 111(2): 391–430.

Einav, Liran, Amy Finkelstein, and Mark R. Cullen. 2010. "Estimating Welfare in Insurance Markets Using Variation in Prices." *The Quarterly Journal of Economics*, 125(3): 877–921.

Frean, Molly, Jonathan Gruber, and Benjamin D. Sommers. 2017. "Premium subsidies, the mandate, and Medicaid expansion: Coverage effects of the Affordable Care Act." *Journal of Health Economics*, 53: 72 – 86.

Geruso, Michael, Timothy J Layton, Grace McCormack, and Mark Shepard. 2019. "The Two Margin Problem in Insurance Markets." National Bureau of Economic Research Working Paper 26288.

Gruber, Jonathan, and Kosali Simon. 2008. "Crowd-out 10 years later: Have recent public insurance expansions crowded out private health insurance?" *Journal of Health Economics*, 27(2): 201 – 217.

Hackmann, Martin B., Jonathan T. Kolstad, and Amanda E. Kowalski. 2015. "Adverse Selection and an Individual Mandate: When Theory Meets Practice." *American Economic Review*, 105(3): 1030–66.

Handel, Ben, Igal Hendel, and Michael D. Whinston. 2015. "Equilibria in Health Exchanges: Adverse Selection versus Reclassification Risk." *Econometrica*, 83(4): 1261–1313.

Peng, Lizhong. 2017. "How Does Medicaid Expansion Affect Premiums in the Health Insurance Marketplaces? New Evidence from Late Adoption in Pennsylvania and Indiana." *American Journal of Health Economics*, 3(4): 550–576.

Saltzman, Evan. 2017. "The Welfare Implications of Risk Adjustment in Imperfectly Competitive Markets." University of Pennsylvania Working Paper.

Tebaldi, Pietro, Alexander Torgovitsky, and Hanbin Yang. 2019. "Nonparametric Estimates of Demand in the California Health Insurance Exchange." National Bureau of Economic Research Working Paper 25827.