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HEALTH PLAN PAYMENT IN U.S. MARKETPLACES:
REGULATED COMPETITION WITH A WEAK MANDATE

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ABSTRACT

The Affordable Care Act Marketplaces were introduced in 2014 as part of a reform of the U.S. individual health insurance market. While the individual market represents a small slice of the U.S. population, it has historically been the market segment with the lowest rates of take-up and greatest concerns about access to robust coverage. As part of the reform of the individual insurance market, the Marketplaces invoke many of the principles of regulated competition including (partial) community rating of premiums, mandated benefits, and risk adjustment transfers. While the Marketplaces initially appeared to be successful at increasing coverage and limiting premium growth, more recent outcomes have been less favorable and the stability of the Marketplaces is currently in question. In this paper, we lay out in detail how the Marketplaces adopt the tools of regulated competition. We then discuss ways in which the Marketplace model deviates from the more conventional model and how those deviations may impact the eventual success or failure of these new markets.

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1. Introduction

The Patient Protection and Affordable Care Act (ACA) of 2010 called for the creation of state-based health insurance markets known as Health Insurance Exchanges or Health Insurance Marketplaces. These markets are intended to provide a new, affordable source for health insurance for Americans who do not receive insurance through their employers or through public programs providing coverage for the elderly (Medicare) and for low-income families (Medicaid). The law included a number of reforms to the non-employer-based private health insurance market (the “individual” market) in the United States that shifted this market toward a model of regulated competition. These reforms included (partial) community rating of premiums, mandated coverage of a basket of “essential health benefits,” and guaranteed issue and renewal provisions prohibiting insurers from rejecting applicants based on their health status. These reforms represented a dramatic shift in the individual market in most states, where previously many insurance products were limited in the scope of what they covered, insurers were allowed to charge higher premiums for sicker enrollees, and some individuals with chronic conditions were unable to find insurers willing to sell them coverage.

The U.S. health insurance market can be broken down into three sectors: employer-sponsored insurance, public insurance (i.e. Medicare and Medicaid), and individual private insurance. The first two sectors, employer and public, are perceived to function relatively well, at least in terms of coverage (although high costs are a perennial concern). These sectors feature relatively high rates of take-up among eligible people and benefits that are perceived as adequate. The individual market is the third and smallest sector, covering only

around 11 million Americans prior to the implementation of the ACA. It also acts as a sort of “market of last resort” for individuals without access to employer or public coverage. Unlike employer and public coverage, the individual market has historically featured low take-up (contributing to the high rate of uninsurance in the U.S.) as well as insurer underwriting and limited benefits driven by adverse selection. In an attempt to increase take-up and address adverse selection problems in this market, the ACA created the Marketplaces and made income-based premium subsidies available to individuals purchasing Marketplace plans. Additionally, a new tax penalty (or “mandate”) was introduced for individuals neglecting to purchase coverage.

As of 2016, about 18 million Americans are enrolled in a Marketplace plan, 85% of whom receive premium subsidies. This represents over 60% of the individual market (US Department of Health and Human Services 2016). Recent research has shown that the premium subsidies have had a meaningful impact on the rate of uninsurance in the U.S., accounting for 40% of the decrease in the uninsurance rate due to the ACA (Frean et al. 2016).¹ Overall growth in the individual market has been significant post-implementation of the ACA. This can be seen in Figure 1, which plots enrollment in the individual market between 2011 and 2015, with the ACA reforms going into effect in 2014.

Data from the first 3 years (2014-2016) suggested that (despite initial technical difficulties) the Marketplaces were functioning reasonably well. Insurer premiums came in below the levels expected by the Congressional Budget Office (Adler and Ginsburg 2016),

¹ The ACA has had much larger impacts on the uninsurance rate, but most of those impacts seem to have come via expansion of the Medicaid program and the “woodwork” effect of increasing take-up of Medicaid among already eligible individuals who were not enrolled.

Textbox: Marketplace vs. Individual-market

While the introduction of the Marketplaces reformed the individual market, the Marketplaces did not replace the individual market. Instead, the Marketplaces entered as a platform where insurers could choose to compete and consumers could choose to purchase coverage within the larger individual market. Private individual health insurance can still be purchased outside of a Marketplace.

This generates two types of plans in the individual market: on-Marketplace plans and off-Marketplace plans. Many ACA reforms apply to both on-Marketplace and off-Marketplace plans such that both sets of plans are subject to the same regulations on premium rating rules, cost-sharing categories, and minimum benefit standards. Importantly, both on- and off-Marketplace plans are part of a single risk pool, meaning (1) risk adjustment transfers occur at the level of the entire individual market, not separately for the on- and off-Marketplace subsets of the market, and (2) insurers cannot assign different prices to the on-Marketplace and off-Marketplace versions of the same plan due to anticipated differences in health status of on-Marketplace and off-Marketplace enrollees.

While the same rules apply on- and off-Marketplace, insurers are not typically required to participate in the Marketplaces. In most states insurers can choose to offer off-Marketplace plans but not to offer on-Marketplace plans. The reverse is not true: Any plan offered on-Marketplace must also be offered off-Marketplace. The biggest difference between on- and off-Marketplace plans is that when an individual purchases off-Marketplace coverage they are ineligible to receive a subsidy.

and premium growth was relatively slow. Many Marketplaces were initially highly concentrated – the average federally facilitated market in 2014 had 3.9 insurers, and almost 30% had just one or two insurers (Dafny, Gruber, and Ody 2015). In 2014, Marketplaces were more concentrated than the wider individual market (U.S. Government Accountability Office 2016). However, there was net insurer entry in 2015-16, with large national companies like United Healthcare expanding their presence.

More recent developments make for a less favorable picture. Two large national insurers (United and Aetna) exited many Marketplaces in 2017, and many smaller “co-op” insurers (which were established and subsidized as part of the ACA) have exited amid insolvency. Additionally, premiums rose markedly among the remaining insurers, with an average premium increase of 24% between 2016 and 2017. These developments became an

important political issue in the 2016 U.S. presidential election, with Donald Trump elected on promises to repeal the ACA (and by implication, end the Marketplaces).

There is much speculation about the reasons for these disruptions in the Marketplaces. Many insurers have cited a sicker-than-expected risk pool, an inadequate risk adjustment system, the only partially-funded risk corridor program, and the end of federal reinsurance payments as important reasons for exiting and raising premiums. A key factor potentially behind many of these issues – and a difference from the standard ideas of managed competition – is that many (likely healthier) eligible individuals have remained uninsured due to a relatively weak coverage mandate (Newhouse 2017). These developments suggest that the future success of the Marketplaces is unknown and likely depends on continual adaptation of the health plan payment system to the new issues raised in the ACA.

We proceed as follows. In Section 2, we describe the organization of the individual market in the United States under the ACA. In Section 3, we describe the payment system used to pay health plans in the individual market. In Section 4, we review the (limited) literature evaluating the Marketplace payment system. Finally, in Section 5 we discuss several issues with the Marketplace payment system and their potential implications for the future stability of the individual health insurance market.

2. Organization of the Health Insurance System

The ACA created Marketplaces within the individual market as part of a package of reforms, and also as a vehicle to increase access to and affordability of health insurance coverage. Each state has its own Marketplace, operated either by a state entity or the federal government in accordance with the state's choice. As of 2016, the federal government ran

34 of the 51 Marketplaces. All Marketplaces must be operated according to federal regulations, but states can set standards that go beyond federal rules.

Health insurers offering coverage in the individual market (both on- and off-Marketplace) must offer plans that cover a minimum set of benefits, called “essential health benefits.” They must offer plans that fall within four levels of increasing generosity: bronze, silver, gold, and platinum. Plans include a number of cost-sharing parameters, including deductibles, coinsurance rates, copays for various drugs and services, and out-of-pocket maximum payments. Due to the complexity of the cost sharing, generosity is summarized by the plan’s “actuarial value,” the percentage of spending on covered services the plan is expected to pay, on average, for a fixed sample of individuals.² Actuarial values must be 90% for platinum plans, 80% for gold, 70% for silver, and 60% for bronze.³ Plans must also meet other minimum requirements set by federal and state regulators, including network adequacy rules, maximum out-of-pocket cost caps, and marketing standards. While some of these additional regulations are related to plan actuarial value, they are separate requirements.

Each state defines rating areas within the state, and eligible individuals within each rating area can choose from among all plans offered to them. The Marketplace functions as a common platform where all on-Marketplace competing plans are offered to consumers in one place. Health insurance issuers meeting minimum federal and state standards are generally allowed to offer as many health plan options in as many rating areas within the

² In practice, the regulator selected a large sample of individuals with employer-provided health insurance and used that sample to construct an actuarial value calculator used by the regulator to determine plan actuarial value (and, thus, metal tier) and by the insurer to design the cost-sharing features of their plans.

³ For reference, 90% actuarial value (platinum) is similar to a generous employer-sponsored insurance plan, while 60% actuarial value (bronze) is equivalent to a high-deductible plan.

state as they wish – although a few states, most notably California (see “Covered California” textbox) and Massachusetts, take a more active role in managing the number and type of plans available to consumers. As such, health insurers typically have wide discretion in plan pricing and flexibility in designing cost-sharing rules (conditional on actuarial value), provider network size, coverage for out-of-network spending, care management rules, and other difficult-to-observe measures of quality and generosity. This flexibility differentiates the Marketplaces from regulated insurance markets in other countries and provides potentially important avenues through which insurers can engage in behaviors related to risk selection.

Plans for the upcoming year are available to consumers on the first day of open enrollment, which now runs from November 1 to January 31st. Outside of open enrollment, health insurers are not required to accept new enrollees unless they fall under special enrollment rules – cases such as losing eligibility for employment-based insurance or Medicaid or the birth of a baby.

Textbox: Covered California

Covered California, California’s Health Insurance Marketplace, is widely viewed as one of the most successful of the ACA Marketplaces. Covered California chose to adopt an “active purchaser” model where the state chooses to play a more active role than other states following the “clearinghouse” model. California has implemented the active purchaser role by limiting insurer entry (only allowing one-third of the insurers who originally expressed interest to actually enter the market), standardizing cost sharing benefit designs, and negotiating prices and benefits with insurers (including provider network size and composition and insurers’ use of non-FFS “alternative” payment arrangements with providers). California has also limited new entry after the initial year of 2014. Entry has been restricted to insurers newly entering California after 2012, insurers that offer MediCal plans, and insurers entering low competition areas (Qualified Health Plan Recertification 2015). The goal of this entry limitation was to stabilize the Marketplace. The regulator also prevented insurers from charging prices that they deemed “too low” as well as “too high.” While state regulators rarely ask insurers to *raise* their premiums, Covered California wanted to ensure that insurers were not engaging in “invest-then-harvest” dynamic pricing strategies, where insurers offer low prices and take losses in order to capture market share the first year but then ramp up prices over time, exploiting

consumer inertia. Finally, Covered California used their access to administrative hospital discharge data to aid insurers in pricing by providing estimates of each plan's risk adjustment transfer payments based on information about the relative rates of various chronic conditions for each insurer's members.

In addition to using active purchasing, Covered California also chose to implement an "active marketer" strategy where the Marketplace invested substantial resources in outreach to groups of enrollees (such as non-English speakers) that insurers were not targeting with their own outreach campaigns. In addition, insurers were required to invest substantial marketing dollars of their own. The rationale for this form of centralized marketing is that individual insurers may underinvest in outreach due to a free riding problem, since consumers induced by marketing efforts to purchase insurance through Covered California may choose to buy a competitor's plan. Covered California's active marketer strategy may help solve this free riding problem.

While the effects of California's active purchaser and active marketer strategies are still unclear, what is clear is that Covered California has achieved several measures of success in its individual market. First, Covered California has high levels of enrollment, with around 1.5 million enrollees in 2016. This comprises 47% of eligible individuals, placing California 9th among states with respect to this measure of Marketplace success (Marketplace Enrollment 2016). Second, adverse selection between on- and off-Marketplace plans seems to be fairly limited. Finally, and most importantly, adverse selection between the insured and uninsured populations in California also seems to be fairly limited (Hsu et al. 2017).

3. Health Plan Payment Design

Health plan payment in the Marketplaces consists of a number of components. First, insurers set and collect premiums for each of their plans. Second, insurers receive premium and cost-sharing subsidies from the government for their subsidy-eligible enrollees. Third, insurers receive or pay risk adjustment, reinsurance, and risk corridor transfers. Figure 2 describes payment flows across the different actors in the market. We will discuss each of these components of the plan payment system in this section.

3.1 Premiums

Plan premium setting in the Marketplaces is subject to a variety of regulations that makes the process differ from a textbook insurance market. Typically, economists think of

firm pricing decisions as taking place at the level of the product (i.e., a specific plan in a given market), with product-specific demand and cost factors determining firm pricing incentives. In insurance markets, economists also consider the possibility that insurers price discriminate across enrollees based on observable risk factors like age and pre-existing conditions. The ACA Marketplaces limit both of these aspects of the insurer premium-setting decision.

First, the Marketplaces regulate how insurers set the premium for a given plan in a given market. Insurers are supposed to adhere to a “single risk pool rating” requirement, which means that insurers must consider all enrollees in all health plans (both on- and off-marketplace) in a given state as one single risk pool when developing premiums. The ACA limits the reasons that an insurer can vary premiums across its individual market plans in a state and subjects these decisions to regulatory oversight.

In practice, this works as follows. Each insurer first develops an “index rate” for a given state. This index rate can be thought of as an “insurer price” that will influence the price of every plan the insurer offers. The index rate then acts as the starting point for building the “plan price” that is assigned to a particular plan offered by the insurer in a particular rating area.⁴ Regulation allows the insurer price and plan price to vary only based on specific factors (which differ between the two). The insurer price is allowed to incorporate average claims for essential health benefits for the insurer’s anticipated risk pool (which can be influenced by risk selection) as well as market-wide adjustments for items such as risk adjustment, fees, and reinsurance. The plan price then builds off the insurer price via a set

⁴ Throughout this section a plan refers to a product-by-rating area pair, so we consider the same plan offered in two rating areas as two plans.

of allowed plan-specific adjustments. Plan-specific adjustments to the insurer price are allowed based on geographic factors, benefit generosity (captured in the metal level and the provision of any additional benefits), network size, and plan management factors (e.g. HMO versus PPO).

Importantly, plan prices – i.e., for different plans offered by the same insurer – are not supposed to incorporate differential selection on health status across plans.⁵ Nonetheless, since insurers may adjust plan-specific premiums for a number of other plan factors (listed above), insurers do have flexibility to incorporate selection- and demand-related factors into *plan* prices via tweaks to their expectations of the allowed adjustment factors. For example, an insurer anticipating that its HMO plans will attract healthier individuals than its PPO plans might tweak its HMO/PPO adjustment factor to incorporate differential selection in addition to structural cost differences between these two plan types.

After the premium for a particular plan (in a particular rating area) is determined in the manner just described, the Marketplaces also restrict how this plan’s premium can vary across individuals. Plan prices may vary across individuals only by age and smoking status. Age-based premium variation is fixed by regulation. Insurers first submit a base price for each plan. Then, the base price is multiplied by a fixed set of age weights (varying from 1.0 for a 21 year-old to 3.0 for a 64 year-old) to produce age-specific premiums. Smoking status is incorporated by multiplying a “smoking” weight by the individual’s age-specific premium. The smoking weight is chosen by the insurer, but it must be between 1.0 and 1.5.

⁵ Recall that the “insurer price” *is* allowed to vary because of risk selection. A single insurer, however, is not supposed to vary premiums across its plans because of anticipated risk selection. The motivation for this asymmetric restriction on including risk selection factors in premiums is not totally clear.

All insurers seeking to offer coverage in the individual market in a given year must submit their plan offerings and premium proposals by June 1 of the prior year. Plan and pricing submissions are reviewed by state and/or federal regulators.⁶ The interactions between regulators and issuers often leads to changes – generally minor but sometimes larger for premiums. This pricing process applies to the entire individual market, not just on-Marketplace plans.

3.2 Subsidies

There are two forms of subsidies in the Marketplaces: (1) premium tax credits, which lower the premiums that low-income enrollees must pay, and (2) cost-sharing subsidies, which make silver plans more generous for a subset of low-income enrollees. We describe these two forms of subsidies in turn.

While the same plans available on-Marketplace are available off-Marketplace, individuals below 400% of the Federal Poverty Line (FPL) have access to premium tax credits only if they buy an on-Marketplace plan. Additionally, those households eligible for cost-sharing subsidies have access to those subsidies only when purchasing an on-Marketplace silver plan. Premium tax credits are applied directly to reduce health insurance premiums owed by eligible enrollees. They are calculated based both on an individual's household income for the year and on the second-lowest price silver plan available on the Marketplace. Specifically, the tax credit is set so that the *post-subsidy* enrollee premium for the second-cheapest silver plan equals a target amount intended to be affordable based on

⁶ Regulators review not only the premiums themselves but the assumptions that map from the insurer premium to the plan premiums. It is this review that allows the regulator to (loosely) enforce the regulations outlined above regarding what factors can and cannot be considered in the development of plan premiums.

an enrollee's income. This target amount rises on a sliding scale from 2% of income for a household with income of 100% of FPL up to 9.7% of income for a person with income of 400% of FPL.

This calculation – the premium of the second-cheapest silver plan minus the income-specific target amount – determines the dollar amount of the tax credit. This tax credit can then be used toward the purchase of any plan on the Marketplace. However, the tax credit cannot be used to reduce the enrollee premium of a plan below \$0 – a constraint that has been binding for some bronze plans for lower-income households.

Individuals may claim their tax credit in two ways. First, an individual can receive an advance premium tax credit (APTC) based on projected household income for the year at the time of enrollment. In this case, individuals pay premiums, net of the tax credit directly to insurers each month, and the federal government pays the tax credit directly to the health insurance issuers. APTCs are an estimate and the individual must reconcile the amount they received based on actual income when they file their income taxes.⁷ Second, an individual may choose to pay the full amount of their premium directly to insurers during the year and then use the tax credits against their tax obligations, receiving any remaining balance in the form of a tax refund from the federal government.

The second type of Marketplace subsidies are cost-sharing reductions. Cost-sharing reductions lower the amount eligible individuals have to pay for out-of-pocket costs like deductibles, copayments, and coinsurance. To qualify, households must have income below 250% FPL and enroll in a silver plan on the Marketplace. Cost-sharing reductions increase

⁷ At the time of tax filing, households with incomes greater than 400% FPL must pay back the full difference between the tax credit they actually received and the tax credit they should have received. Households with incomes less than 400% FPL repay only part of this difference.

the actuarial value of the silver plan (70% at baseline) to 94% for individuals below 150% FPL, to 87% for individuals between 151% and 200% FPL, and to 73% for individuals between 201 and 250% FPL. When insurers submit their plans and rates for the year, they also include 73%, 87% and 94% versions of all of their silver plans. Eligible individuals are automatically enrolled in the increased actuarial value silver plan of their chosen silver plan on the Marketplace and, unlike tax credits, do not need to reconcile any subsidy received when filing their taxes. Health insurers receive money from the federal government based on a per capita enrollee estimate of cost-sharing subsidies during the course of the year. Then, during the following year, health insurers reconcile with the federal government the per capita dollars they received during the year with the actual dollar amount of cost-sharing reductions received by the enrollees throughout the year.

3.3 Risk Adjustment

To mitigate problems caused by risk selection across plans in the individual market, the ACA established a permanent risk adjustment program. This program transfers funds from (both on- and off-Marketplace) plans with healthier enrollees to plans with sicker enrollees, after accounting for age and other factors on which premiums already vary at an individual level. Risk adjustment aims to make plan premiums charged to enrollees reflect differences in scope of benefits and network coverage rather than differences in enrollee health status. It also aims to mitigate incentives for plans to avoid high-cost individuals.

The individual market risk adjustment program is made up of two components: a *risk adjustment model* (which determines individual risk scores) and a *risk transfer formula*

(which determines monetary transfers across plans). We will discuss these two components of the program separately.

Risk Adjustment Model

The risk adjustment model assigns risk scores to enrollees based on their demographics and observed diagnoses during the concurrent plan year (i.e. calendar year). The risk score reflects the individual's predicted costliness to the insurer relative to an average enrollee. Risk scores are calculated using a model developed by the Department of Health and Human Services (HHS), the HHS Hierarchical Condition Categories (HHS-HCC) model. The HHS-HCC model predicts an enrollee's medical spending in the current year by mapping diagnoses coded on insurance claims into one of 100 HHS-selected HCCs, which were selected from the full 264 HCCs in the diagnostic classification system (Kautter et. al. 2014). To determine which HCCs to include in the HHS-HCC model, HHS used four main criteria: (1) that the HCC had to represent clinically-significant, well-defined, and costly medical conditions; (2) that the HCCs are not especially vulnerable to discretionary diagnostic coding; (3) that the HCCs do not primarily represent poor quality or avoidable complications of medical care; and (4) that the HCCs should identify chronic, predictable, or other conditions that are subject to insurer risk selection, risk segmentation, or provider network selection, rather than random acute events that represent insurance risk. The HCC indicators enter into a linear regression model predicting total cost.

The starting point for the HHS-HCC model is the model used in Medicare Advantage, the CMS-HCC model. The CMS-HCC model was modified to reflect three major differences between Medicare Advantage and the individual market. The HHS-HCC

model: (1) uses concurrent year diagnoses and demographics to predict spending (rather than the past year's variables used by the CMS-HCC model); (2) reflects HCCs more relevant to the under-65 population (such as those related to childbirth); and (3) predicts total spending including drug costs (which in Medicare are covered by Part D). The full HHS-HCC risk adjustment model incorporates 15 different variations—one model for each age group- (adult, child, and infant) by cost-sharing level (platinum, gold, silver, bronze, and catastrophic). The separate models are meant to capture major differences across the age groups and differences across the cost-sharing levels in the portion of medical spending covered by the insurer. The adult and child models include the same variables (with the exception of a few interactions) but differ in the payment weights because the adult model is estimated on a sample of adults and the child model is estimated on a sample of children. The infant model uses a different set of risk variables: a set of 20 mutually exclusive categories based on a subset of HCCs that are relevant to infant health status. Additional details on the HHS-HCC risk adjustment model are provided in a textbox.

Textbox: Details of the Marketplace (HHS-HCC) Risk Adjustment Model

The HHS-HCC risk adjustment model is designed to determine individual risk scores, which measure how costly an individual is relative to the average market enrollee, for individuals enrolled in Marketplace plans. To determine such risk scores, HHS constructed a linear model using age, sex, and diagnosis information to predict individual-level total costs. The HHS-HCC model consists of separate models for adults (age > 20), children (age 1-20), and infants (age < 1).

The HHS-HCC model uses the Hierarchical Condition Category (HCC) classification system. The system consists of 254 Condition Categories (CCs) that map the universe of ICD-10 diagnoses to unique clinical conditions. The system takes all of the diagnoses submitted for a given individual and maps them to CCs. A binary variable for each CC is created, and if the individual has at least one eligible diagnosis appearing on a health insurance claim that maps to the CC, the individual is given a value of 1 for that CC. The system then takes the Condition Categories and produces Hierarchical Condition Categories. For sets of related Condition Categories, hierarchies are pre-specified so that more-severe conditions are higher in the hierarchy than less-severe conditions. The HCCs are generated by setting to zero for an individual any CCs for which there is a CC “higher up” in the CC’s hierarchy that is set equal

to 1. This ensures that for each individual, only the most severe CC in a hierarchy is turned “on” and all less-severe CCs are turned “off.” The mapping from ICD-10 diagnoses to HCCs is described in Figure 3.

Of the 254 HCCs, the same 127 were chosen for inclusion in the child and adult HHS-HCC models. Variables were chosen based on how discretionary diagnoses were and how well they predict spending as well as other considerations laid out in Kautter et al. (2014). Of these 127 HCCs, 53 were combined into 17 HCC groups for the adult model in order to improve the precision of the coefficient estimates. For the child model 50 HCCs were combined into 17 groups. A “Severe Illness Indicator” was also formed, equal to 1 if one of 8 high-severity HCCs is equal to 1. This indicator was not included in the model but was instead used to form two interaction groups, indicating interactions between severe conditions. These interaction groups were included in the adult model but not the child model. The final adult model includes 18 age-by-sex groups, 74 individual HCCs, 17 groups of HCCs, and 2 interaction groups for a total of 111 variables. The final child model includes 8 age-by-sex groups, 77 individual HCCs, and 17 groups of HCCs for a total of 102 variables.

The infant HHC-HCC model also starts with the HCC classification system. 108 relevant HCCs are grouped into 5 severity groups. A hierarchy is then imposed on the severity group such that each infant is only in the most severe severity group for which he has an HCC. HCCs describing prematurity are then mapped to 5 maturity levels: extremely immature, immature, premature multiples, term, and age 1. A hierarchy is then imposed on the maturity level so that each infant is assigned only to the most severe maturity level for which he has an HCC. Neither the maturity level nor the severity level variables are included directly in the infant model. Instead, they are interacted with one another to form a set of 25 mutually exclusive severity-by-maturity cells. The model then consist of these 25 cells.

In the absence of actual claims data from a yet-to-be formed Marketplace, HHS used data from Truven MarketScan Commerical Claims and Encounter Data, a dataset of individuals in employer-sponsored plans, to calibrate the model. For each of the three populations, 5 models were estimated, one for each plan tier (platinum, gold, silver, bronze, catastrophic). For each model, total spending was first calculated for each individual and then a standard cost-sharing schedule (deductible, coinsurance, out-of-pocket maximum) was applied to determine the total plan spending for the tier. Models were then estimated separately for adults, children, and infants using ordinary least squares, constraining coefficients to be greater than or equal to zero and constraining coefficients on more-severe categories within a hierarchy to be larger than less-severe categories within the same hierarchy.

Risk Transfer Formula

Next, HHS inputs enrollee risk scores into a “risk transfer formula” that determines transfer payments across insurers. Transfer payments are intended to offset cost differences due to risk selection while preserving cost differences due to plan features (e.g., moral

hazard, actuarial value, provider network) and allowable rating factors like age. Transfer payments depend on a plan's average risk score relative to the market average risk score and are constructed to be budget neutral in a given year. Payment transfers occur among (both on- and off-Marketplace) platinum, gold, silver, and bronze plans as a single risk adjustment pool, with a separate risk pool for catastrophic plans.

The risk transfer formula is complex and not always intuitive from an economic standpoint. Here, we try to provide some insight into the regulator's thought-process in constructing the formula based on the discussion in Pope et al. (2014). Later, we will discuss some of the potential problems that the formula may introduce.

First, the regulator constructs an estimate of what a plan's premium *would be* without risk adjustment. To do this, the regulator starts with the statewide (enrollment-weighted) average premium and accounts for the following factors driving differences between the underlying costs for a given plan and the statewide average: health risk, coverage (i.e. actuarial value), demand-response (i.e. moral hazard), and geography. Other factors contributing to differences in premiums across plans, such as plan type (HMO vs. PPO) and demand, are not accounted for in the risk transfer formula. The regulator constructs her estimate via the following formula:

$$\hat{P}_j = \left(\frac{Risk_j \cdot IDF_j \cdot Geo_j}{(Risk \cdot IDF \cdot Geo)_s} \right) \cdot \bar{P}_s$$

\bar{P}_s represents the statewide (enrollment-weighted) average premium. $Risk_j$ is the average risk score among plan j 's enrollees, IDF_j is a plan-specific "induced demand factor" calibrated by the regulator and meant to capture differences in costs across plans with different actuarial values caused by demand-response (moral hazard) to the coverage level,

and Geo_j is a geographic factor meant to capture differences in costs across plans due to differences in the geographic distribution of a plan's enrollees. The denominator is a statewide (enrollment-weighted) average of the product of these factors. Note that a plan's actuarial value does not explicitly enter the formula. The regulator argues that this is because it implicitly enters via $Risk_j$ due to the fact that there are different risk adjustment models for plans with different actuarial value levels, as explained in the textbox describing the HHS-HCC model (Pope et. al. 2014).

Next, the regulator constructs an estimate of what a plan's premium would be without risk selection, conditional on the "allowable rating factors." To do this, the regulator again starts with the statewide average premium, but this time accounting for all of the previous factors contributing to differences in underlying costs across plans *except for health risk* ($Risk_j$). The regulator constructs this estimate via the following formula:

$$\bar{P}_j = \left(\frac{AV_j \cdot Age_j \cdot IDF_j \cdot Geo_j}{(AV \cdot Age \cdot IDF \cdot Geo)_s} \right) \cdot \bar{P}_s$$

For this estimate, the regulator again includes the induced demand factor, IDF_j , and the geographic factor, Geo_j . But now two additional factors are also included: the actuarial value of the plan, AV_j , and an age factor equal to the average age weight (the age-based premium factors discussed above) for the plan's enrollees. While these two factors were not explicitly included in the regulator's estimate of the plan's premium without risk adjustment (\bar{P}_j), the regulator argues that they were implicitly included via the risk score calculation, which incorporates both the plan's actuarial value (different models for each actuarial value level) and age distribution (age groups are included in the risk adjustment model).

The risk adjustment transfer is defined as the difference between the estimate of the premium with risk selection, \hat{P}_j , and the estimate of the premium without risk selection, \bar{P}_j :

$$T_j = \hat{P}_j - \bar{P}_j = \left\{ \frac{Risk_j \cdot IDF_j \cdot Geo_j}{(Risk \cdot IDF \cdot Geo)_s} - \frac{AV_j \cdot Age_j \cdot IDF_j \cdot Geo_j}{(AV \cdot Age \cdot IDF \cdot Geo)_s} \right\} \cdot \bar{P}_s$$

The use of the statewide (enrollment-weighted) average premium combined with the normalization of the numerators of both terms in brackets by their statewide averages ensures that transfers are budget neutral within a given year and market. This is true even in the presence of insurer “upcoding” of enrollee risk scores – in contrast to the Medicare Advantage market where upcoding increases government spending (Geruso and Layton 2015). The transfer is meant to eliminate premium differences stemming from risk selection. Thus, if the difference between the estimate of the premium with risk selection and the estimate of the premium without risk selection is positive, a plan receives a transfer payment, and if the difference is negative, a plan owes transfer funds.

Risk adjustment and payment transfer calculations occur annually after the coverage year ends, following a period to allow all claims to be submitted by providers. Only the summary measures necessary to calculate the transfer payments are provided to HHS. Individual claims and risk score data are kept by the insurer and are not required to be reported, except in the case of an audit. After health insurance issuers run the HHS software to get a risk score for each of their enrollees, issuers report the average risk score for their enrollees, the average enrollment-weighted premium for their enrollees, and other demographic and enrollment details necessary for HHS to implement the risk adjustment transfer formula. After HHS completes the risk adjustment transfer calculation, HHS

reports balances to issuers and transfers across insurers are routed through HHS. Apart from a small administrative fee to HHS, the transfers are budget neutral.

3.4 Risk Sharing

The Marketplace payment system features two risk sharing features. Both are temporary, in place from 2014-2016, with the goal of stabilizing the market in the short-term to encourage insurer entry. The first is a reinsurance policy, reimbursing insurers for a portion of individual-level spending exceeding a threshold. The second is a risk corridor program, compensating insurers for a portion of any losses exceeding a pre-specified threshold and extracting a portion of profits.

Temporary Reinsurance Program

The ACA established a temporary reinsurance program for plans in the individual market (both on- and off-Marketplace). The program was in place from 2014-16 and was intended to stabilize premiums during the initial years of reform by helping cover the costs of very high-cost enrollees. While it is not totally clear why reinsurance was temporary, a possible reason was the hope that over time, insurers would learn the extent to which these high-cost cases affected their costs and incorporate that information into plan premiums.

The program, run by HHS, collected per-capita fees from all commercial insurance (both in the individual *and* group market, including self-insured plans) in amounts totaling \$10 billion in 2014, \$6 billion in 2015, and \$4 billion in 2016 and transferred these funds to individual market plans when their enrollees incurred high costs. Individual market plans received reimbursement for an enrollee's annual costs above an attachment point – \$45,000 for 2014-15 and \$90,000 for 2016 – up to a reinsurance cap of \$250,000. Because the

reinsurance program could not pay out more than the amount collected, the percentage of costs reimbursed for a given year depended on the total funding available. In 2014, 100% of the costs were reimbursed, but this fell to 51% in 2015.

The reinsurance program differed from risk adjustment in two notable ways. First, it was based on enrollees' *actual* costs – rather than predicted costs as used in the risk adjustment model. Second, unlike risk adjustment, the reinsurance program involved a net transfer of funds *into* the individual market from the group market (which helped fund the fees). This meant that the end of reinsurance in 2017 involved a net funding reduction. Insurers' large premium increase in 2017 partly reflects the one-time loss of reinsurance as a funding source.

Temporary Risk Corridors

The ACA also set up a temporary risk corridor program for 2014-16. Underlying this program is the idea that, with uncertainty about the costliness of enrollees in a new market, issuers might stay out of the market or price higher than otherwise. Because the Marketplaces represented an entirely new market, and the risk mix of the individuals who would enroll in the market was previously unknown, there was a great deal of uncertainty around the consequences of entry for a particular insurer. Many of the insurers also had little experience with risk adjustment in general, having previously participated mostly in the individual market or in the employer market (neither of which used risk adjustment). Additionally, the risk adjustment system used in the Marketplaces was different from the systems used in other U.S. markets such as Medicaid and the Medicare Advantage program, in that the Marketplace system was “balanced budget,” and depended on transfers

across insurers rather than from the government to insurers. Because of these issues, it was difficult for insurers to predict (1) what the costs of their enrollees would be and (2) what their risk adjustment payments would look like (including whether they would be positive or negative). This uncertainty provided a rationale for implementing this temporary risk corridor program.

The program – which applies only to Marketplace-certified plans (Qualified Health Plans) – worked like a profit and loss sharing program between insurers and the government. Plans first calculated a “benchmark” rate, equal to 80% of their premium revenue, and the amount spent on health care plus quality-improvement.⁸ The state shared in “profits” when spending was less than 97% of the benchmark and shared in “losses” when spending exceeded 103% of the benchmark. The profit sharing rate was 50% for the first 5% of costs (i.e., between 92-97% or 103-108% of the benchmark). For instance, a plan with spending between 92-97% of its benchmark owed HHS 50% of the difference between 97% of the benchmark and their actual spending. The profit sharing rate was 80% for all profits/losses beyond this amount.

As originally enacted, risk corridor payments were not required to be budget neutral. As a result, the program gave insurers a strong incentive to lower premiums. Each \$1 of lower premiums could be passed onto enrollees, increasing demand, but a portion of the lower per-enrollee profit (or increased losses) would be offset by additional risk corridor payments. Perhaps as a result, many insurers “underpriced” their plans, setting premiums such that spending exceeded their benchmark.

⁸ Costs are defined in the same manner in which the medical loss ratio is defined for the same market.

However, following a backlash against what some Republicans labeled as a “bailout” of money-losing insurers, Congress changed the original program by specifying that payments could not exceed charges for a given year. Such a change meant that the risk corridor program could pay out very little of its liabilities. HHS was only able to pay out 12.6% of claims for 2014 and has announced that any revenues collected for 2015 will go toward (but far from cover) existing 2014 issuer claims. This change was made after plan prices were set for 2015, implying that any issuer that incorporated the original risk corridor payments into their 2014 or 2015 pricing decision experienced an unexpected negative shock to revenues. This shock may have contributed to the forced (co-ops) or voluntary (Aetna and United) exit of many insurers from the Marketplaces in 2016 and 2017.

4. Evaluation of Health Plan Payment

Generally, evaluations of health plan payment systems come in two forms. The first is *ex-ante* evaluations that use data from other markets and simulate plan payments and costs under a given payment system. The second is *ex-post* evaluations that use data from the actual market of interest to determine how well the payment system works in practice. Because the Marketplaces are so new and access to data is so limited, most studies evaluating the Marketplace plan payment system fall into the *ex-ante* category, with a few notable exceptions that we discuss below.

Ex Ante Evaluations

All of the *ex-ante* studies of the Marketplace plan payment system use data from large employers or the Medical Expenditure Panel Survey (MEPS). The first evaluation was

produced by the Marketplace payment system designers (Kautter et al. 2014). They found that for the different risk score models (by age group and metal level, as described above) the R-squared statistic (in a regression predicting costs) varied between 0.3 and 0.36. They also looked at predictive ratios (the ratio of simulated revenues to realized costs) for subgroups of the population, focusing largely on groups defined by quantile of the distribution of predicted spending. They find that predictive ratios for most quantiles are close to 1, indicating little incentive to attract or deter these groups of individuals. This result is not surprising because individuals were grouped by quantile of *predicted* spending rather than *actual* spending meaning that any spending not picked up by the risk adjustment model would also not be picked up by the grouping of individuals.

McGuire et al. (2014) also evaluate the performance of the Marketplace plan payment system. In their evaluation, McGuire et al. again use predictive ratios but for subgroups of individuals with four chronic conditions: cancer, heart disease, diabetes, and mental health conditions. In addition, they use measures based on Ellis and McGuire's (2007) "predictability and predictiveness" index of the incentives for a profit maximizing plan to ration a particular service to attract healthy enrollees and avoid sick ones. They find that, even after accounting for risk adjustment, strong incentives remain to avoid individuals with chronic conditions, with the strongest disincentives attached to cancer and mental health conditions.

Montz et al. (2016) delve further into the payment system's performance with respect to individuals with mental health conditions. They find evidence of service-level selection incentives within the HHS-HCC risk adjustment system as individuals with mental health conditions are undercompensated by the model, especially those with anxiety, mood, and

adjustment disorders. Examining differences between the HHS-HCC risk adjustment system and those used in Medicare Advantage and Medicare Part D, the study suggests that the treatment of prescription drugs in the HHS-HCC system may contribute to this under-compensation. The reliance on a model not optimized for predicting drug spending may result in the HHS-HCC model failing to adequately account for conditions that do not typically result in high medical spending but that do result in high prescription drug spending.

Handel, Hendel, and Whinston (2015) and Layton (2015) evaluate the Marketplace payment system with respect to its ability to limit welfare losses due to adverse selection. Both focus on selection between bronze and platinum plans and both find that with no risk adjustment, the platinum plan death spirals, leaving all enrollees in the limited coverage bronze plan. Handel, Hendel, and Whinston find that a risk adjustment system that bases transfers on realized costs corrects part of this market failure. Layton presents similar findings for a simulation of the actual Marketplace payment system, implying that the payment system seems to perform well with respect to its ability to weaken adverse selection. Both of these studies simulate plan prices and consumer choices using data from large employers.

Layton, Ellis, McGuire, and van Kleeef (2017) introduce new measures of payment system performance that are “valid, complete, and practical,” where valid refers to their being based in a formal model of welfare economics, complete refers to their incorporation of all components of the payment system, and practical refers to their ability to be readily implemented by researchers and policymakers. The main measure they develop is “payment system fit” which is the R-squared from a regression of individual-level spending

on the revenue (from premiums, risk adjustment, reinsurance, etc.) a plan would receive from enrolling the individual. They also show the additional importance of “premium fit” or how well premiums match an individual’s expected cost. They make the important conceptual point that, because no single premium can typically achieve first-best sorting of individuals across plans, any payment system evaluation must take account of premium fit *and* payment system fit separately. Finally, they present a measure of incentives for service-level selection under a given payment system recently developed by Layton, McGuire, and van Kleeef (2016). They use all of these measures to evaluate the Marketplace plan payment system relative to an alternative system. They simulate the payment systems using data from the MarketScan Database of employer-provided health insurance claims. Unlike the other studies that use MarketScan data, they restrict the dataset to individuals who look similar to individuals eligible for coverage through the Marketplaces, as identified in the MEPS.⁹ They find that the Marketplace’s concurrent risk adjustment system performs well with respect to payment system fit and the service-level selection measure. They also find that the reinsurance system in place in 2014 produces dramatic improvements in these measures. Premium fit is weak because premiums vary only by age, but it is better than in other markets where premium discrimination is not allowed at all.

Geruso and McGuire (2015) introduce a new evaluation criteria, the “power” of the payment system, and apply it to the 2017 Marketplace payment system as well as several alternatives. Power is defined as the portion of the marginal dollar a plan spends on an enrollee that is borne by the plan. The concept stems from the observation that under a

⁹ See Rose et al. (2015) for a discussion of the methods that produced this dataset.

given payment system, when a plan spends an extra dollar on an individual, the revenue the plan receives for that individual may be affected. Consider a payment system incorporating reinsurance. Under such a payment system, a plan only bears $(100-X)\%$ of the marginal dollar it spends on an individual whose spending exceeds the reinsurance cutoff, where X is the reinsurance policy's reimbursement rate. Intuitively, power captures the strength of a plan's incentive to control their enrollees' costs. It is clear that reinsurance weakens power by reimbursing plans for a portion of the marginal dollar spent on high-cost individuals. Geruso and McGuire argue that risk adjustment has similar properties: risk scores are based on diagnoses coded in insurance claims, and these diagnoses cannot appear unless an enrollee visits a doctor. Thus, the first doctor visit for an individual with a chronic condition generates a large increase in revenue, weakening the incentive to limit the cost of physician visits. Geruso and McGuire operationalize power by randomly eliminating outpatient days and inpatient admissions and observing how costs and simulated revenues respond. They show via simulation that the power of the Marketplace's concurrent risk adjustment system is relatively low, around 0.25 with reinsurance and around 0.6 without it (where 1.0 indicates full power). On the other hand, they find that payment system fit is relatively high, around 0.6 with reinsurance and around 0.4 without. Finally, they bring these two measures together with another novel measure, "balance," to show that the 2017 Marketplace payment system is dominated by a payment system consisting of prospective (rather than concurrent) risk adjustment and a reinsurance policy compensating plans for 80% of an individual's annual spending above \$60,000.

A final *ex-ante* evaluation is by Layton, McGuire, and Sinaiko (2016). They focus on the final component of the Marketplace plan payment system, risk corridors, and compare

the Marketplace risk corridor and reinsurance programs with respect to insurer risk protection and the power measure developed by Geruso and McGuire (2015). They find that both Marketplace policies offer substantial risk protection, and that they perform similarly when compared on both power and risk protection simultaneously.

Ex Post Evaluations

Due to the relatively young age of the Marketplaces as well as limited data availability, there are few *ex-post* evaluations of the Marketplace payment system. One exception is evidence from Massachusetts, which established a health insurance marketplace (the Connector) in 2006 that was a model for the ACA Marketplaces. The Connector shared many of the features of the ACA Marketplaces including strict limits on premium discrimination, generous subsidies, a coverage mandate, and risk adjustment payments.

Shepard (2016) studies the subsidized portion of the Connector for low-income people, called Commonwealth Care. He studies the role of adverse selection in affecting insurers' incentives to offer a more generous hospital network that covers certain "star" academic hospitals. He finds that plans covering star hospitals attracted a much higher-cost set of members – in particular those with existing relationships with the star hospitals and their affiliated physicians. The Connector's risk adjustment system compensated these plans for about two-thirds of these patients' higher costs. But even after risk adjustment, these patients were substantially more expensive (about 28% higher) than other individuals. Shepard shows that much of their higher costs reflect differential "moral hazard," in the sense that these enrollees' costs increase more when their plan covers the star hospitals and they shift their care to those hospitals and away from cheaper providers.

Geruso, Layton, and Prinz (2016) combine *ex-ante* and *ex-post* techniques to study the performance of the Marketplace payment system with respect to insurer incentives to inefficiently ration access to prescription drugs that attract unprofitable enrollees. They first use Marketscan data and simulated revenues under the Marketplace payment system to assess for each drug class the over-/underpayment for individuals taking drugs in the class as well as the “predictability and predictiveness” measure of insurer incentives to distort coverage developed by Ellis and McGuire (2007). They find that the Marketplace payment system performs reasonably well. Figure 2 from their paper is reproduced here as Figure 4. It plots for each drug class the average cost vs. the average revenue associated with people taking drugs in the class. It is clear that most classes lie close to the 45-degree line, implying an alignment of costs and revenues. A few classes, however, are far from the 45-degree line. Geruso, Layton, and Prinz then go to *ex-post* data on the drug formularies of Marketplace plans. They show that the generosity of the Marketplace formularies for a given drug class is highly correlated with their measures of the insurer’s incentive to ration access to the drugs in the class in order to avoid unprofitable enrollees. This result holds even when adding data on employer formularies (where there is no selection incentive) and including drug class fixed effects to control for drug characteristics that are fixed across the employer and Marketplace markets. They also find that the result is largely driven by the most salient drugs in a class, the drug spending component of an individual’s profitability, and the drug classes in the far right tail of the distribution of selection incentives. They conclude that while the Marketplace payment system performs well for the vast majority of drug classes, it performs poorly with respect to a few (such as classes that include fertility

drugs and drugs used to treat multiple sclerosis) and that insurers respond to the incentives generated by that poor performance.

5. Ongoing Issues and Reforms

5.1 High Cost Cases

One of the major issues cited by insurers exiting the Marketplaces between 2016 and 2017 was the end of the federal reinsurance program, described in Section 3. Under this program, a per capita assessment was collected from most insurers (including from plans in the separate group insurance market), and the proceeds of the assessment were paid out to reimburse individual market insurers for spending on extremely high-cost cases. This program was intended to limit insurer risk during the Marketplaces' early years in order to encourage entry and boost competition. It was intended to be a complement (rather than a substitute) for private reinsurance that insurers themselves can purchase, in that it covered a range of high cost cases that typically fall below the cutoffs in private reinsurance contracts.

It also differed from private reinsurance in two important respects likely to favor higher-cost plans (and those that attract sicker enrollees). First, the program involved a net transfer of funds into the individual market, since fees were collected from both group and individual market plans but payouts were made only to individual market plans. Second, the fees funding the program were a flat per-capita amount for all plans, regardless of their cost structure or likelihood to attract sicker enrollees. A private reinsurer, by contrast, would likely charge a higher fee to plans that were *predictably* higher-cost or adversely

selected (e.g., plans with broad networks) and therefore more likely to draw on reinsurance. Together, these factors suggest that the ACA reinsurance program involved a net subsidy to the individual market and specifically to its highest-cost plans.¹⁰

The recent exit of insurers citing the end of the reinsurance program as a factor in their decision suggests that the program may have been successful at inducing entry into the Marketplaces. Some insurers may have been induced to enter but later decided they could not remain viable in these markets without the reinsurance subsidy. This has spurred some discussion about a way to embed a permanent, budget-neutral version of the original reinsurance program in the Marketplaces, while complying with statutory language requiring the original reinsurance program to end in 2016.

There are several potential motivations for an extension of this program. First, the program has the potential to reduce the risk faced by insurers in the Marketplaces. Many insurers purchase private reinsurance, suggesting risk aversion (Layton and McGuire 2017). A public reinsurance program can provide insurers with risk protection without the profit margin collected by private reinsurers. Second, reinsurance acts as a subsidy to plans that attract costly individuals, potentially combatting adverse selection problems and weakening insurer incentives to distort plan benefits to attract healthy enrollees (Layton, Ellis, McGuire, and van Kleef 2017). Of course, these motivations must be weighed against the standard concern that reinsurance weakens plan incentives to control costs.

HHS recently proposed to modify the risk adjustment formula to include effective reinsurance for high-cost cases, though budget-neutral transfers across plans within the

¹⁰ As a result, the end of reinsurance has been cited as contributing factor for the large (and politically damaging) premium increases in 2017.

individual market rather than a transfer from group market plans to individual market plans (US Department of Health and Human Services 2016). The proposal calls for extremely high cost cases to be pooled across insurers via the risk adjustment transfer formula discussed in Section 3. This option is explored along with an additional option of incorporating reinsurance into the risk adjustment formula developed in Layton and McGuire (2017) who show analytically that both the HHS proposal and their alternate plan (which incorporates spending above a threshold as a risk adjustment factor) are equivalent to a conventional budget neutral reinsurance policy. They also show that with a minor modification (accounting for reinsurance when estimating risk adjustment weights), these methods actually improve upon conventional reinsurance in terms of payment system fit. They argue that incorporating reinsurance into the risk adjustment system is better than a conventional public reinsurance system because all reinsurance-related administrative costs are eliminated. Finally, they show via simulation that all policies have significant effects on the probability that a small insurer faces a catastrophic loss, but essentially no effect on the level of risk faced by a large insurer. Notably, however, their proposal would not include the inflow of funds into the individual market that occurred under the ACA's reinsurance program.

HHS is currently implementing the risk adjustment formula modification just discussed for 2017. The current HHS rule calls for a policy that protects insurers from cases exceeding \$1 million in a year. Choosing the “correct” level of protection is a difficult task because the benefits of insurer risk protection must be weighed against the possibility of weakening insurer incentives to control costs (e.g., via care management or aggressive price negotiations with providers). A policy providing partial coverage can mitigate this

problem but will not fully eliminate it. Despite these difficulties, it is likely that a great deal of risk protection can be achieved with limited effects on insurer incentives: Layton and McGuire show that with a cutoff of \$500,000, only 0.02% of their sample is affected, but risk of a large loss is greatly reduced for small insurers. Additionally, recent evidence shows that in Medicaid managed care insurers' ability to affect the spending of the high cost cases affected by these reinsurance policies is fairly limited (Geruso, Layton, and Wallace 2016), suggesting that the weakening of insurer cost-control incentives for these extremely high cost cases may be a second-order concern. It is important to note, however, that while this policy will protect insurers against risk, it will not provide a net subsidy to individual market plans as the previous reinsurance policy did.

5.2 Selection Against the Marketplaces within the Individual Market

While the ACA established the Marketplaces, it did not require that all individual market policies be sold through them. It is not widely known that 38% of individuals with individual market coverage are enrolled in an off-Marketplace plan (US Department of Health and Human Services 2016). When individuals purchase off-Marketplace coverage, however, they are not eligible for the subsidies available when purchasing a plan on the Marketplace.

While all new off-Marketplace plans are required to comply with ACA rating and benefit rules, there are plans offered off-Marketplace in the individual market that are not subject to some of the new rules. These so-called “grandfathered” and “grandmothered” plans – the first a construct of the ACA law and the second the result of an administrative ruling – were intended to create a smooth transition to the fully-reformed ACA individual

market. However, these plans likely contribute to adverse selection against the ACA-compliant market, since healthier individuals are more likely to find the pre-ACA health-rated premiums to be attractive. These plans are decreasing in number and will likely be all but gone by 2018.

A grandfathered health plan is a plan that was in place on the date of enactment of the ACA (March 23, 2010) which has continuously covered at least one person and has not changed coverage terms. These plans are essentially exempt from all of the ACA market changes. Grandmothered plans were created as a transitional policy (to end December 31, 2017) by the administration to allow plans newly created between March 23, 2010 and January 1, 2014 to continue to operate under the post-2010 and pre-2014 rules for their existing enrollees if allowed by their regulating states. Grandmothered plans must comply with more ACA regulations than grandfathered plans (e.g., prohibition on annual and lifetime limits on coverage) but do not have to comply with rating and benefit rules put in place in 2014.

Even without the grandfathered and grandmothered plans, this off-Marketplace/on-Marketplace distinction presents a potential for adverse selection. While the entire individual market (both on- and off-Marketplace) makes up a single risk pool (for risk adjustment) and is subject to the same pricing and guaranteed issue regulations, the off-Marketplace individual market may still have more attractive enrollees. If lower-income individuals eligible for subsidies are higher cost *conditional on risk adjustment*, plans may wish to avoid them by only offering their products off-Marketplace where subsidies are not available, an action allowed by most states. Many of the large insurers exiting the on-Marketplace market in 2017 remained in the off-Marketplace individual market, suggesting

differential risk selection patterns in these two segments of the market (Families USA 2012).¹¹ However, at this point there is no empirical evidence regarding the differential risk profiles on- and off-Marketplace. More research is needed to understand whether and to what extent this is a problem, and to what extent the price-linked subsidies available in the Marketplaces counteract the consequences of adverse selection.

5.3 Adverse Selection into the Individual Market

While in the previous section we discuss selection against the Marketplaces within the individual market, we now turn to the topic of adverse selection into the entire individual market, both on- and off-Marketplace. The ACA includes both carrots (subsidies) and sticks (coverage mandates/penalties) to encourage Americans to obtain insurance. Both subsidies and mandates/penalties can address the consequences of adverse selection (Einav and Finkelstein 2011). In the Marketplaces, the system of carrots and sticks have not led to complete take-up of insurance. Subsidies are only available to low- and middle-income enrollees, and the size of the subsidy declines with income, reaching zero for people whose incomes exceed 400% of the FPL. In contrast, in Medicare *all* consumers effectively receive a voucher equal to (or approximately equal to in the case that they choose a Medicare Advantage plan) their expected cost in Fee-for-Service Medicare. These limited subsidies mean that healthy middle- to high-income people may be unwilling to buy coverage at Marketplace prices, which reflect higher demand for insurance among the sick.

¹¹ A HIPAA provision may also have contributed to the decision by these insurers to remain in the off-Marketplace individual market. The provision states that if an insurer exits the individual market, it is banned from re-entering the market for 5 years.

The stick in the ACA is an income-based tax penalty on all individuals who do not obtain insurance. While this stick encourages coverage, it appears to not be large enough to lead to universal take-up of insurance. In 2016, 10.7 million individuals eligible for coverage through the Marketplaces remained uninsured. 8.1 million households paid a penalty for not purchasing insurance in 2015, with the average annual penalty equal to \$210.

This mix of carrots and sticks makes the Marketplaces an experiment with regulated competition that allows for empirically relevant levels of “opting out” of the market. Allowing consumers to “opt-out” of coverage may interact in important ways with the payment system. Specifically, a budget neutral risk adjustment system like the one embedded in the Marketplace payment system can only alleviate problems of adverse selection across plans *within* the market. Such a policy does nothing to weaken the forces of adverse selection *into* the market (i.e. healthier people choosing to remain uninsured).

Newhouse (2017) considers the design choice between the “zero-sum” Marketplace risk adjustment system versus the Medicare Advantage system. He makes the conceptual point that the zero-sum system protects the government from payments increases due to “upcoding” of conditions by insurers. But the cost is that the zero-sum system does not protect insurers from adverse selection into the market. He argues that selection into the market can still lead to death spirals, despite the presence of risk adjustment.

In fact, risk adjustment may have unintended consequences in this voluntary environment. Consider the case of an insurer that offers low-cost basic coverage and an insurer that offers high-cost enhanced coverage. With no risk adjustment, the price of the basic plan will be low due to its low costs *and* its healthy enrollees. If risk adjustment is

implemented, the basic plan will be required to pay transfers to the enhanced plan to compensate the enhanced plan for its sicker enrollees. This will increase the price of the basic plan and decrease the price of the enhanced plan, leading some individuals to shift from basic to enhanced coverage. But it may also lead some individuals in the basic plan to drop out of the market due to the plan's higher price, possibly worsening welfare. The net efficiency consequences of risk adjustment in this environment are thus theoretically ambiguous.¹²

Panhans (2016) provides recent evidence on the extent of this problem. He exploits price variation due to rating area boundaries to find that a 1% increase in premiums in a given market leads to a 0.8% increase in the average cost in the market. He also estimates willingness-to-pay for insurance, allowing him to use the Einav, Finkelstein, and Cullen (2010) framework to assess the welfare losses due to adverse selection in these markets. His analysis suggests that the current premium subsidies are “too low,” and that higher subsidies would improve welfare. He also finds that age-targeted subsidies that are higher for younger consumers are a more efficient way to improve welfare than the income-based subsidies currently in place (a point also made by Tebaldi (2016)).

5.4 Transfer Formula

The mechanism by which risk adjustment is implemented in the Marketplaces is the so-called risk adjustment “transfer formula” presented in Section 3. Interestingly, the transfer formula used in the Marketplaces differs from that of most other public health insurance

¹² We note that the mechanism discussed in this paragraph applies only to the Marketplaces' unsubsidized enrollees. For subsidized enrollees, the ACA's “price-linked” subsidy design (see discussion below) means if there is adverse selection into the market, subsidies automatically increase to keep the post-subsidy price of the basic plan equal to a target “affordable” amount.

programs. One key feature of the transfer formula may have important implications for adverse selection and the incentive for an insurer to offer generous plans.

Other public insurance markets (e.g., Medicare Advantage (MA) and the pre-ACA Massachusetts Connector) use an “own-price” transfer formula. After calculating an enrollee’s risk score – which captures the person’s expected costliness relative to an average individual – the risk score multiplies the *plan’s price* to determine what the insurer receives. So a plan with price P_j that covers an enrollee with risk score r_i receives a payment of $r_i P_j$. This payment can be written as the sum of the plan’s price plus a transfer amount:

$$Payment_{ij} = P_j + (r_i - 1) \cdot P_j \quad (\text{MA Formula})$$

The key feature of MA’s own price formula is that the transfer amount scales with both the enrollee’s risk score and the plan’s price.

The ACA Marketplaces use a different transfer formula, which we call an “average price” transfer. Conceptually, the transfer is based on the enrollee risk score times the *average plan price* in the market, \bar{P} .¹³ Formally:

$$Payment_{ij} = P_j + (r_i - 1) \cdot \bar{P} \quad (\text{ACA Formula})$$

Because Marketplace risk scores are normalized to have mean 1.0 (as discussed above), the ACA formula ensures that transfers are budget neutral when averaged over all enrollees and plans. Guaranteeing budget neutrality seems to be the practical reason this formula was adopted (Pope et al. 2014).

¹³ The full ACA transfer formula is conceptually similar but more complicated (see Section 3.3).

However, the different format has real implications for payments to different types of plans and therefore insurer incentives. Specifically, high-price plans (i.e., $P_j > \bar{P}$) that attract sicker enrollees ($r_i > 1$) do worse under the ACA's average price formula than under the MA own-price formula. If high-price plans have a higher cost structure (e.g., because they have a broader provider network), then the transfer for sicker enrollees may not make up for these enrollees' extra costs.¹⁴ Insurers would then have an incentive to discontinue high-cost, high-price plans that are adversely selected on *observable* risk – even if there is no unobserved risk selection. This dynamic would augment any incentive to reduce generosity because of unobserved risk selection (as we discussed earlier).¹⁵

This brief analysis of differences between these two risk adjustment systems serves to cast light on a component of risk adjustment systems that has not received much attention from researchers but that can have important implications for the plan payment and thus market outcomes. All countries implicitly use some form of a transfer formula. This analysis shows that it may be beneficial for policymakers and researchers to study these formulas more explicitly. More research is needed in this area to understand the empirical significance of the differences between transfer formulas. Additional work is also needed in order to understand the efficiency consequences of transfer formula design. For example, in

¹⁴ Note that the logic we have discussed requires that the cost increase of a high-cost plan for sicker enrollees must be greater than for healthier enrollees. This would be true, for instance, if a high-cost plan raised all enrollees' costs proportionally (e.g., by 20%), but would not be true if it raised all enrollees' costs by a fixed amount (e.g., \$50).

¹⁵ Interestingly, low-price ($P_j < \bar{P}$) plans that attract healthy ($r_i < 1$) enrollees also do worse under the ACA's formula. This suggests that rather than a “race to the bottom” – as typically occurs under adverse selection – there could be a “race to the middle.” In practice, if enrollees are highly price sensitive, the average price will be close to the cheapest plans' prices, making this issue more significant for high-price plans. Additionally, if the “own-price” transfer formula were modified to be budget neutral by adding a per capita risk adjustment fee equal to the average risk adjustment transfer, low-cost plans would likely be worse off under the “average price” formula relative to the “budget neutral own-price” formula.

the case of the MA vs. the Marketplace formula it is not clear whether the ACA's formula is more or less desirable than MA's for achieving efficient market outcomes. It is possible that the MA formula overpays high-price plans for sick enrollees, leading to levels of generosity that are "too high" from a social efficiency perspective and too little competition on prices.

5.5 Price-Linked Subsidies

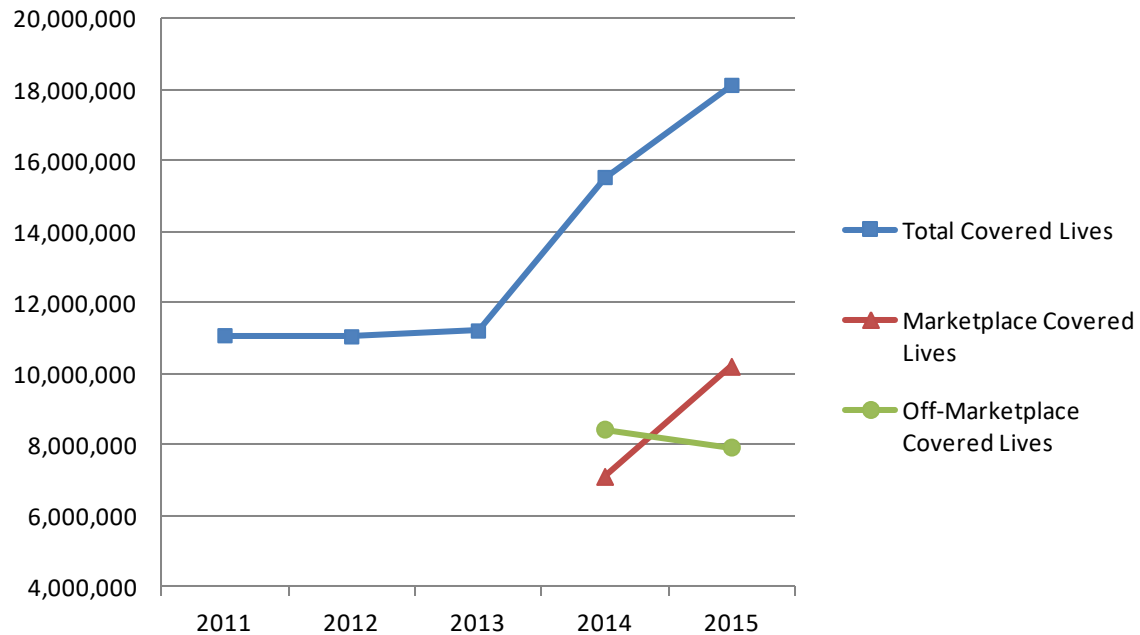
A key feature of the Marketplaces' subsidies is that they are linked to insurers' prices, specifically the price of the second-cheapest silver-tier plan in a given market. Subsidies are set so that this plan's post-subsidy price equals an "affordable" amount based on a consumer's income (which varies between 2-10% of monthly income). If a consumer buys a higher- or lower-price plan, they pay or save the incremental price, as long as this does not push their payment below zero.

Jaffe and Shepard (2017) and Tebaldi (2016) analyze what this "price-linked" subsidy design means for competition, relative to a system in which policymakers set a "fixed" subsidy amount based on their best estimate of what prices will be. They show that price-linking weakens price competition, since insurers that expect to be "subsidy pivotal" have a greater incentive to markup their plans' prices.

However, the price-linked design also has desirable properties in the presence of uncertainty about medical costs or the selection of consumers into the Marketplaces. In particular, if all prices rise in tandem (e.g., because of a cost increase from an expensive new drug), government subsidies automatically increase to bear the costs. Essentially, the government bears the risk of unexpected price/cost shocks, which Jaffe and Shepard (2017)

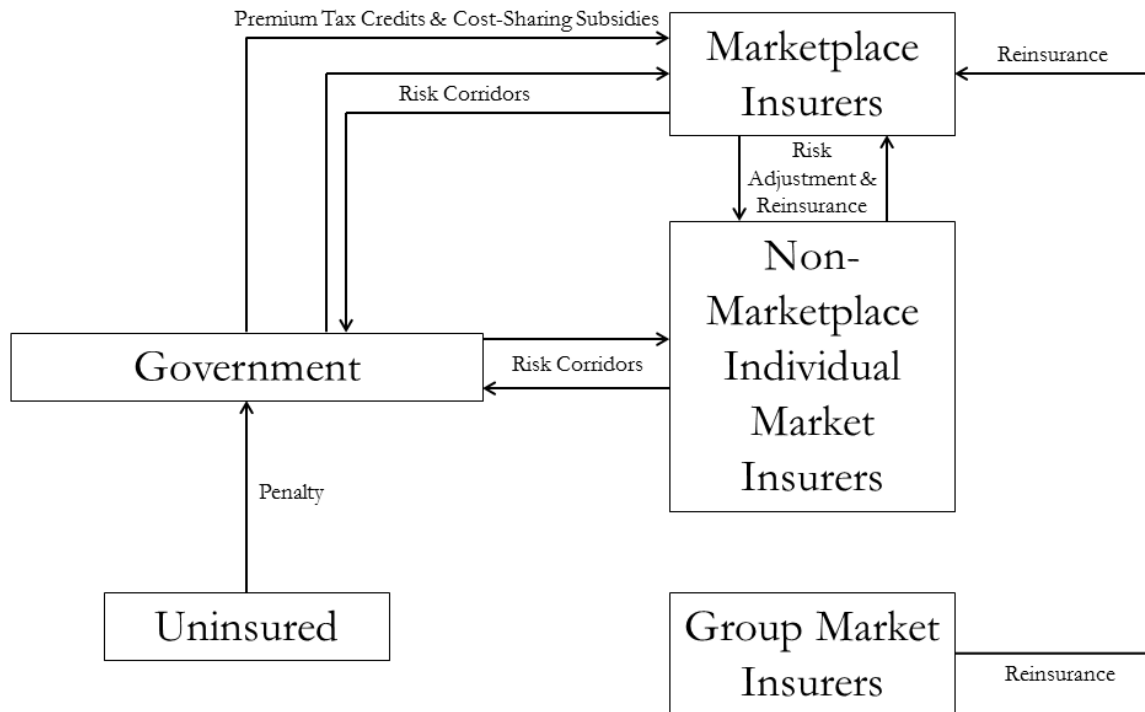
argue is desirable in some circumstances. In particular, they argue that price linking may stabilize participation and the level of coverage. For instance, if prices increase sharply – as is occurring in the Marketplaces in 2017 – the automatic adjustment to subsidies means that *post-subsidy* prices (for the benchmark plan) will not increase for the ~85% of enrollees who are below 400% of poverty and receive federal subsidies. Therefore, it is unlikely that there will be a substantial reduction in coverage for this group. Price-linked subsidies therefore may be able to arrest an adverse selection death spiral before it starts. Of course, the inverse is true as well: if costs decline unexpectedly, there will not be gains in coverage, as federal subsidies will instead fall.

Figure 1: Growth of the Individual Market (2011-2015)



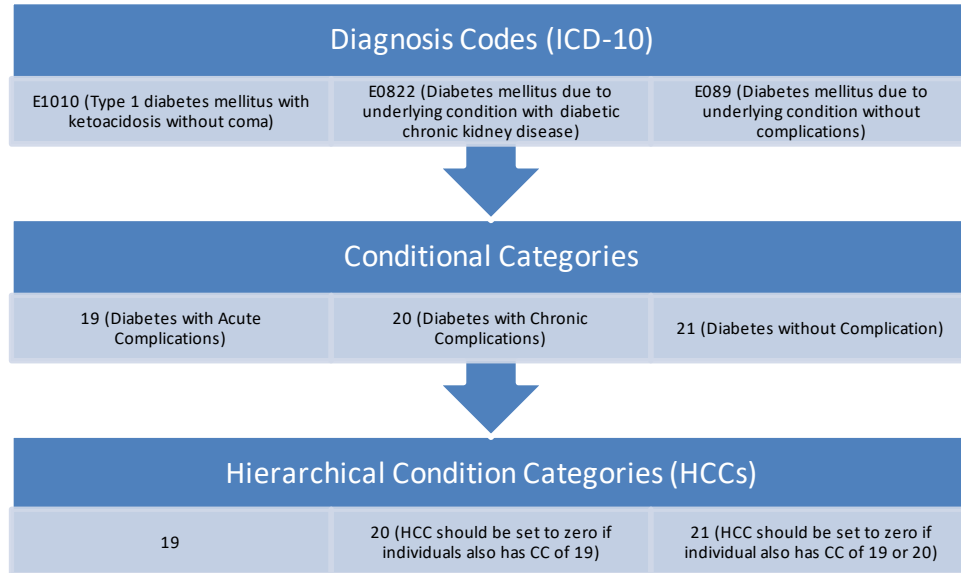
Notes: Number of total covered lives in the individual market is calculated by summing the “life years” reported across all insurers in the individual market in the Medical Loss Ratio data from the Department of Health and Human Services (CMS 2015). Life years are calculated by summing the number of individuals enrolled on a given day in each month divided by 12). The number of Marketplace covered lives is taken from the “effectuated enrollment” numbers as reported by the Office of the Assistant Secretary for Planning and Evaluation at the Department of Health and Human Services. Effectuated enrollment numbers represent the number of confirmed customer paying premiums at a given point during the year, in this case, March. The number of off-Marketplace covered lives is calculated by taking the different between total and on-Marketplace enrollment. The authors note there is measurement error in this calculation because of the manner in which covered lives are calculated in the MLR data compared to effectuated enrollment data. There does not exist a consistent measure of total and on- and off-Marketplace enrollment overtime. As such, Figure 1 should be taken as representative.

Figure 2: Payment Flows under the Marketplace Plan Payment System



Notes: This figure illustrates payment flows across actors in the U.S. health insurance market under the Marketplace payment system. Six components of the Marketplace payment system are illustrated: the penalty for remaining uninsured, premium tax credits, cost-sharing subsidies, risk corridor payments, risk adjustment transfers, and reinsurance transfers/payments. Penalties are paid by the uninsured to the government. The government pays premium tax credits to Marketplace plans. Risk corridor payments are made by profitable Marketplace and non-Marketplace insurers to the government and by the government to unprofitable Marketplace and non-Marketplace insurers. Risk adjustment payments are made by Marketplace and non-Marketplace insurers with low-risk enrollees to Marketplace and non-Marketplace insurers with high-risk enrollees. All insurers (individual and group market) make reinsurance contributions. Marketplace insurers and non-Marketplace insurers with high-cost enrollees receive reinsurance payments.

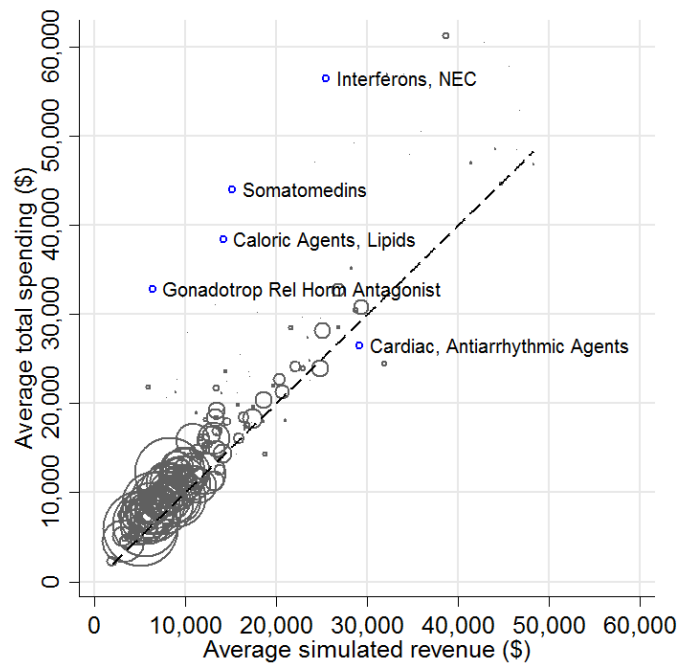
Figure 3: Mapping of ICD-10 Diagnoses to Hierarchical Condition Categories (HCC): The Case of Diabetes



Source: Risk Adjustment: HHS-Developed Risk Adjustment Model Algorithm Software.
<https://www.cms.gov/CCIIO/Resources/Regulations-and-Guidance/index.html#PremiumStabilizationPrograms>

Notes: The figure illustrates the mapping from ICD-10 diagnosis codes to Hierarchical Condition Categories (HCCs) for the case of diabetes. The HCC system starts by mapping every diagnosis code to a Condition Category (CC). HCCs are then generated by setting to zero any CC for which the individual has a more severe CC in the same hierarchy.

Figure 4: Costs vs. Revenues for Individuals Taking Drugs in Different Therapeutic Classes



Notes: This figure is from Geruso, Layton, and Prinz (2016). Each point represents a drug class, with the size of the point indicating the importance of the drug class in terms of individuals. The x-axis shows average simulated revenue for individuals taking a drug in the class. The y-axis shows average total (drug and non-drug) spending for individuals taking a drug in the class.

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