

# Designing and Regulating Health Insurance Exchanges: Lessons from Massachusetts

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Abstract: The Massachusetts health care reform provides preliminary evidence on the function of health insurance exchanges and individual insurance markets. We describe the type of products consumers choose and the dynamics of consumer choice. Evidence shows that choice architecture affects choice, including product standardization and the use of heuristics (rules of thumb). In addition, while consumers often choose less generous plans in the exchange than in traditional employer-sponsored insurance, there is considerable heterogeneity in consumer demand, as well as some evidence of adverse selection. We examine the role of imperfect competition between insurers, and document the impact of pricing and product regulation on the level and distribution of premiums. Given our extensive choice data, we synthesize the evidence on the Massachusetts exchange to inform the design and regulation on other exchanges.

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## 1. Introduction

Exchanges are transforming the way consumers purchase health insurance, by lowering transaction costs and providing a new regulatory framework for insurance purchased directly by households from insurers. As a result of the 2010 Affordable Care Act (ACA), individual states and the federal government will set up a number of health insurance exchanges (HIEs). HIEs play a crucial role in health reform, and will provide coverage for a projected 20 million people (CBO 2012).

While the broad outlines of exchanges are set by the ACA, many regulations are in flux. States have substantial latitude in shaping how exchanges operate and the way consumers make decisions.<sup>1</sup> Yet because exchanges are new, exchange designers have been forced to rely on intuition rather than evidence. While most evidence on health insurance choice comes from decision in the context of employer-sponsored insurance, exchanges are different. Employers bargain with insurance companies and act as price setters and gatekeepers. On the exchanges, insurance companies will price and market directly to individuals, and the exchanges will offer a wider range of choice than most employers. Moreover, the regulation of prices and how they can vary will differ on the exchanges, as will be the structure of the subsidies individuals receive.

The Massachusetts health insurance exchange offers the first look at health insurance exchanges in operation.<sup>2</sup> Much can be learned from the Massachusetts experience, since the federal reform roughly parallels the 2006 Massachusetts health reform: both include a mandate, and both rely on health insurance exchanges to facilitate households' insurance purchase. We have studied the

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<sup>1</sup> Exchanges can differ in how they are regulated. For example, while the ACA specifies a 3:1 maximum allowable age rating band in the individual health insurance exchanges, states can impose more strict regulation. For example, Maryland has chosen a price ratio of 2.8. Similarly states can shape the user interface of the exchange (e.g. the website).

<sup>2</sup> Utah also operates a smaller health insurance exchange that provides an alternative model for a minimally regulated exchange. Enrollment in the Utah exchange is smaller, and its insurance regulatory environment differs from the environment that will be set up by the ACA.

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unsubsidized Massachusetts health insurance exchange (“the Connector”) in depth, focusing on particular issues such as the use of heuristics (or, “rules of thumb,” Ericson and Starc 2012a), the role of imperfect competition and pricing regulation (Ericson and Starc 2012b), and the effect of product standardization (Ericson and Starc 2012c). This paper provides a synthesis of that evidence.

## **2. Background on the Massachusetts HIE**

The Massachusetts unsubsidized health insurance exchange (a program called Commonwealth Choice, run by the Commonwealth Connector Authority) performs both retail and regulatory functions. It was created as a result of the 2006 Massachusetts health reform law, which had the goal of providing universal coverage for state residents. A key feature of this reform was the individual mandate, which required all Massachusetts residents to purchase a minimal level of health insurance coverage (“minimum creditable coverage”), or face a penalty equal to half of the premium of the lowest cost health insurance plan offered through the exchange. In addition to the individual mandate, there was also an employer mandate: employers with eleven or more employees were required to make a “fair and reasonable” contribution to employees’ health insurance costs. The reform has succeeded in reducing uninsurance to 2.6% (Long and Phadera 2009). Increases in the insured came via individuals purchasing insurance through the unsubsidized exchange, through increased offering of employer-provided health insurance, and through expansions in subsidized coverage (Gruber 2011). As a result of the reform, hospitalizations for preventable illnesses decreased (Kolstad and Kowalski 2010) and visits of children to emergency room decreased (Miller 2012), with corresponding increases in outpatient care.

The state established the Commonwealth Choice unsubsidized health insurance exchange for those residents above 300% of the poverty line who were not offered employer-sponsored insurance. We examine this unsubsidized exchange, as it is most similar to the exchanges created through the ACA: it offers plans of varying generosity offered by competing insurers. Subsidies in Massachusetts look

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very different than in the ACA. Massachusetts offered coverage to lower income residents either through expanded public coverage (Medicaid) or through a separate subsidized market, called *Commonwealth Care*. Individuals in the subsidized Commonwealth Care market do not choose what level of insurance plan to enroll in, but are assigned to a plan tier based on their income; they can, however, choose between insurers. Moreover, in contrast to the unsubsidized exchange and the ACA, insurance premiums in Commonwealth Care do not vary by age of enrollee. In fact, about half the enrollees in Commonwealth Care pay no premium regardless of which insurer they pick.

The Massachusetts environment that we examine differs in some ways from the ACA. Under both the Massachusetts reform and the ACA, prices are set in a modified community rating framework: prices can vary by only certain enrollee characteristics and only within certain ranges. For instance, prices can vary by age, but the maximum allowable price ratio between different ages is stricter in Massachusetts (2:1) than in the ACA (3:1). Additionally, minimum medical loss ratio (MLR) regulation is a feature of the federal, but not the Massachusetts, reform. Finally, the subsidies in the federal reform are extended to more consumers (up to 400% of the FPL).<sup>3</sup> Nonetheless, Massachusetts still provides the best possible laboratory for studying the design and regulation of exchanges.

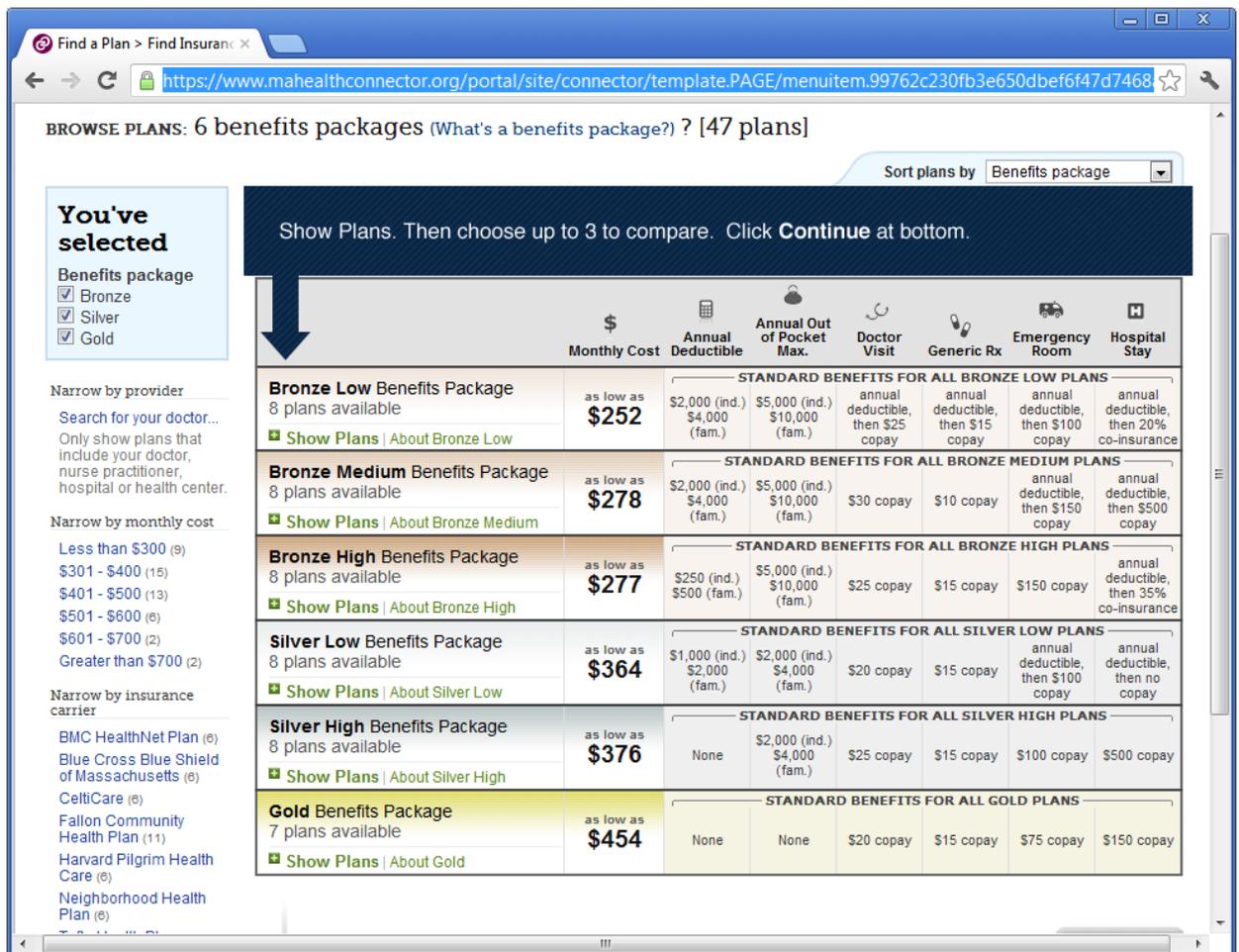
On the exchange, competing insurers offer various plans, grouped into tiers of generosity (bronze, silver, and gold) and, in certain time periods, subtiers (low, medium, and high). Prices also vary by geographic location and age. Even holding age and location constant, there is substantial variation between brands for plans with similar or identical financial characteristics: in Jan. 2010, the monthly premium for a “Silver-Low” plan design for a 30-year old resident of Boston was \$410 from Fallon Community Health Plan and \$287 from Tufts Health Plan. This variation can arise because consumers perceive quality differences in provider networks, or because they believe brand signals some other

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<sup>3</sup> As a result, once the ACA comes into full effect, some enrollees in the currently unsubsidized Massachusetts HIE would be eligible for federal subsidies.

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dimension of quality. Consumers choose plans on the exchange via a website that presents information about the plans (print resources are also available). Figure 1 shows a screenshot from the website, circa September 2012.



**Figure 1: Snapshot of the Massachusetts health insurance exchange interface.**

The different tiers of plans are characterized by *actuarial values*, which give the percent of medical spending that would be insured for a representative sample of the population. Bronze plans have an actuarial value of about 55%, with the other 45% of spending coming out of pocket. A typical bronze plan deductible is about \$2000 for an individual plan, and the lowest sub-tier (Bronze-Low) qualifies as a high-deductible health plan for federal tax purposes. The actuarial value for silver plans

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can range from 70-80%, and gold from 85 to 95%. Silver and gold plans are more in line with typical employer-sponsored HMO and PPO plans, which have actuarial values of 80-85% and 90+%, respectively (Peterson 2009). Note that the ACA will divide plans into tiers slightly differently: exchanges will have four tiers (bronze, silver, gold and platinum) with minimum actuarial values of 60%, 70%, 80%, and 90%, respectively.

In addition to the primary market, the exchange operates a separate “Young Adult Plan” (YAP) market for 18-26 year olds. YAPs are cheaper, but less generous than bronze plans. For instance, many YAPs have had maximum annual spending limits of \$50,000; the ACA prohibits annual spending limits. Few enrollees eligible for YAPs opt for the more generous bronze (or higher) coverage.

### 3. Type of Plans Chosen on the Exchange

A substantial fraction of enrollees (40-60%) on the Mass. HIE choose the least generous tier of coverage sufficient to satisfy the mandate (bronze coverage); this fraction varies slightly over time due to changes in the Connector’s policies, as discussed below. Recall, bronze plans are typically less generous than the plans chosen by enrollees in employer-sponsored insurance. We note several potential sources of the difference:

- *Preferences*: Enrollees in the exchanges may have different preferences and a lower value for insurance than the rest of the insured population. This is most likely to be true for enrollees who were induced to purchase insurance by the individual mandate and who would otherwise remain uninsured.
- *Tax Treatment*: plans purchased on the exchange are bought with post-tax dollars, while employer-sponsored insurance benefits from favorable tax treatment. If insurance plans bought on the exchange were bought with pre-tax dollars, the marginal cost of more generous

insurance would be lower. Tax-treatment can account for part, but not all, of the difference. In our simulations, if prices of the plans on the exchange were all reduced by a 30% subsidy, the fraction choosing bronze plans only falls slightly: from 63% down to 44% to 60%, depending on specification. (Ericson and Starc 2012a).

- *Duration of Coverage*: The median time enrolled in the exchange is 1.25 years, which is less than the typical tenure in employer-provided insurance. Herring (2011) uses the Community Tracking Study and finds that only 17% of insured individuals in private insurance switched plans in a given year. In contrast, on the Massachusetts HIE, about 40% of enrollees leave the exchange within 1 year of enrollment. Many enrollees on the exchange may be simply purchasing “stop-gap insurance” until they get employer-sponsored insurance.
- *Greater Range of Choice on the HIE*: Despite the growing popularity of high-deductible health plans (HDHP) as a way to curb growth in health insurance premiums, employer-sponsored insurance does not typically offer the same range of choice as found on the exchange. Choices may differ on the exchange because the options available are wider. The ability to provide choice to consumers is a way exchanges can generate value for consumers (Dafny, Ho, and Varela 2012).
- *Choice Architecture and “Nudges”*: Finally, as discussed in the following section, choice architecture may determine, in part, the products chosen by consumers. As a result, exchange designers may be able to alter the types of products chosen by changing the choice process.

Policy makers should be aware of how the demand in the exchange can differ from more traditional markets when contracting with insurance firms and making predictions about the products purchased.

#### 4. Decision Process and Enrollee Choices

Consumers often lack “health literacy”— the ability to understand basic health-related information to make informed decisions (Paasche-Orlow et al. 2005). For instance, when the elderly chose prescription drug plans in the Medicare Part D, they overweighed salient plan features such as price and underweighted other relevant features, such as expected out-of-pocket costs and risk protection. Abaluck and Gruber (2011). Health insurance is an complex product, and the various coverage characteristics of insurance are hard to tradeoff (e.g. lower coinsurance versus higher deductible or copayments). Thus, on the HIEs, consumers may rely on simplified decision rules—heuristics, or rules of thumb— as they make choices.

In Ericson and Starc (2012a), we test for whether enrollees in the Massachusetts HIE use a particular heuristic: “choose the cheapest plan.” Enrollees may use this heuristic because the lowest priced plan is listed first in the list of plans, and it may thus benefit from an increase in salience or prominence. Moreover, price is simple to evaluate-- a consumer can easily see which plan is cheaper, but have a harder time comparing the generosity of bronze plans with different deductibles and coinsurance. This is especially true in the period of time we consider (2009), before the exchange standardized the financial attributes of plans within each tier. Consistent with the use of this heuristic, we show a large jump in enrollment for the cheapest plan--indicating some consumers choosing solely on price. This can result from using the “choose the cheapest plan” heuristic, or because enrollees do not value the other attributes of the plans (and are thus extremely price sensitive).

If enrollees rely on heuristics, exchange designers will need to pay attention to “choice architecture” and create a decision process that leads enrollees to make wise choices. Decisions on how to present information matter. Presenting standardized summaries of benefits (as required by the ACA) may help consumers compare types of plans. Other decision tools or recommendation tools can also aid

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enrollee decision making, but it is important that they be well-designed. The Medicare Part D Plan Finder provides a cautionary example. It helps seniors compare drug insurance plans, and it allows them to enter the drugs they are currently taking. By default, Plan Finder ranks plans based on its estimate of the enrollee's annual out-of-pocket costs for the drugs the enrollee is *already* taking. As a result, it omits good measures of the financial risk enrollees face—the distribution of their out-of-pocket costs if new health problems developed. While the Medicare Part D Plan Finder may help enrollees make a decision, it may also lead them to sacrifice risk protection by focusing on premiums and predictable expenses alone.

## 5. Standardizing Health Insurance Plans

Because the way information is presented can substantially affect choice, the most important plan features should be made the most salient. Moreover, making it easier to compare price and quality across plans has the potential to improve the competitiveness of insurance markets.

Regulators have the power to shape both what is offered on the exchange and how it is presented. Standardized formats for information disclosure can enable consumers to more easily compare plans. Standardizing insurance plan designs will reduce the dimensions on which plans vary, thereby decreasing the amount of information that must be disclosed and allowing consumers to focus on the most important plan dimensions. Most existing health insurance markets do not have standardized plan types.<sup>4</sup>

In Ericson and Starc (2012c), we examine a natural experiment on the Connector. Prior to 2010, insurers on the Massachusetts HIE had wide latitude to design insurance plans, which were then grouped into tiers based on actuarial value. Beginning in 2010, insurers were required to offer only

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<sup>4</sup> Medicare Supplemental Insurance (Medigap) is a notable exception.

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seven defined plans each—for instance, all “bronze-low” plans have the same deductible, copayments, and coinsurance parameters.<sup>5</sup> There remained differences among insurers in provider network, but financial comparisons became easier.

Standardization mattered for market outcomes: it shifted consumers into more generous products. Post-standardization, the fraction of enrollees in a high-deductible health plan drops from 54% to 29%, and the fraction of enrollees in bronze plans drops from 63% to 44%. There are similarly large shifts in insurer market share: as a result of standardization, some insurers introduced (or removed) relatively popular plans. While the exact reasons for these changes in choice are still speculative, one effect of standardization was to make financial generosity easier to observe and therefore value. As a result, consumers can be confident that they really are getting a more generous plan when they choose a plan in a higher tier. Product standardization is often touted as a way to strengthen the power of competition, leading to lower prices. However, we do not find a major effect of standardization on the price level of insurers (though it can be difficult to distinguish any effect of standardization from other trends in pricing). Moreover, because consumers chose more generous plans, the average premium paid actually rose by a few dollars a month— largely because more generous plans are expensive, despite any change in competitive pressure.. We do see that standardization changed the relative weights consumers placed on plan features. Post-standardization, consumers place higher weight on clearly financially relevant characteristics, such as deductibles.

Standardization of products matters for choice. Standardization has the potential to improve outcomes for consumers—with some caveats. The exchange designers could pick the wrong standardized plans, either due to lack of knowledge or lobbying. In addition, standardizing plans can limit insurer innovation in plan design. Innovation in the Massachusetts HIE has continued post-

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<sup>5</sup> The Silver Medium tier was later discontinued due to lack of demand.

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standardization— “limited network” plans were introduced as a potentially cost-saving tool—but insurers face additional barriers to the introduction of potentially innovative benefit designs. Indeed, the exchange has recently considered allowing insurers to offer new plan types, so long as they continue offering the standardized plans as well. As more exchanges are set up under the ACA, cross-state variation in plan menus can shed additional light on the costs and benefits of standardization.

## 6. Dynamics and the Choice of Open Enrollment Periods

Consumer choices have a dynamic component: they can choose when to enroll in the coverage through the exchange, and how long they stay enrolled. Dynamic behavior matters for insurers, since their profits depend not only on market share, but also on how long consumers are enrolled. Length of time enrolled in a plan can be correlated with an enrollee’s cost to the insurer, with short-term enrollees potentially having higher average health costs (if they time their entry to coincide with needed episodes of care) or lower average health costs (if sicker individuals have higher switching costs). Moreover, turnover itself may be costly due to administrative expenses.

Prompted by complaints from insurers that short-term enrollees (enrolled less than 1 year) had higher than average health costs, the exchange changed when enrollees can enroll in the coverage.<sup>6</sup> Beginning in 2011, consumers were limited purchasing coverage on the exchange during defined open enrollment periods (initially every 6 months, now every year), unless they fell under an exemption

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<sup>6</sup> Using claims data provided by insurers, Wyman, Welch, and Giesa (2010) examined how the ratio of health costs to premiums varied by duration enrolled in health plans. They find that the relative cost of short-term enrollees increased after the 2007 implementation of the Massachusetts health reform, which was interpreted as consumers gaming the system when they could enroll at any time. However, the report did not examine whether the characteristics of the short-term enrollees changed post-reform. Since health reform induced different types of people to buy coverage (e.g. via the mandate), a change in the type of enrollees who were short-term provides an alternative explanation for these results.

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category (such as losing alternative coverage). Previously, consumers could purchase coverage in the exchange each any month.

The goal of these open enrollment periods is to curb gaming by consumers. Understanding the impact of such policies requires information on the behavior of enrollees—how does length of time enrolled vary with types of coverage chosen, or observable demographic characteristics? To begin to describe the dynamics of coverage through the exchange, Figure 2 gives the Kaplan-Meier graph for enrollment in the exchange—how the probability an individual is still enrolled in the exchange varies with time since enrollment. The median consumer is enrolled in a plan on the exchange for approximately 1.25 years (455 days).<sup>7</sup> However, there is also significant variation in duration of coverage that is related to observable characteristics.

We estimate how the probability of leaving the exchange varies with observable characteristics using Cox proportional hazard models in Table 1.<sup>8</sup> Hazard ratios that are greater than one indicate someone is more likely to exit the exchange; less than one, less likely to exit. Table 1 finds that older consumers tend to be covered for longer periods than younger consumers. Consumers over fifty-five are almost half as likely to exit the exchange at any point in time, compared than their counterparts under thirty. This could be because they have higher demand for medical services or are less likely to be budget-constrained (more able to afford insurance). In addition, female consumers are more likely to leave the Connector than male consumers.

Yet despite significant variation in enrollment duration by demographic characteristics, there is little variation across plan types. The hazard ratios in Table 1, column 2, shows that compared to enrollees in

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<sup>7</sup> We define enrollment duration as time between first entrance into the exchange and the last transaction (i.e. a payment), plus 30 days—this may not precisely correspond to the date their coverage was terminated. Our estimates account for censoring at the end of the data (i.e. we do not see when someone who joins in the last month of our data ends coverage.)

<sup>8</sup> Consumers are counted as staying within the exchange if they switch plans in the exchange. Their hazard rate will depend on the plan they are currently enrolled in.

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gold plans, the exit rate for consumers enrolled in bronze plans are not statistically different. In fact, the point estimate (0.96) indicates that bronze enrollees are less likely to leave the exchange. Similarly, enrollees in silver plans are also less likely to leave the exchange, compared to enrollees in gold plans.

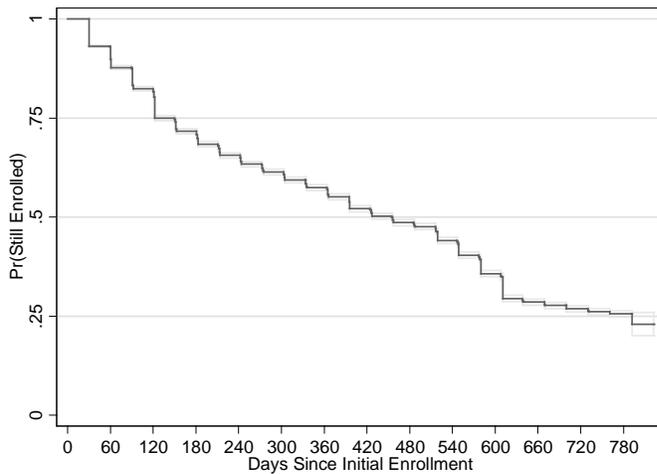
A limitation of these models is that they don't take into account that the relationship between enrollment duration and tier of plan chosen might not be constant over time—for instance, perhaps gold enrollees leave very quickly. Indeed, behavior at very short horizons might be different. We ran a probit regression for the probability an enrollee exits the exchange within 95 days of entry; 14% of individuals in our sample exit this quickly. A probit model shows that conditional on other observables, bronze and silver enrollees are slightly less likely to exit this quickly, approximately 2 percentage points ( $p=0.01$ ).

These results suggest that gaming the system (adverse selection based on expected time enrolled in plans) is not a major driver of length enrolled in the exchange. Given the high deductibles of the bronze plans, an individual expecting high medical spending and a short enrollment duration should instead enroll in gold (or potentially silver) plans. Since the extent of dynamic adverse selection seems limited, the cost of less flexibility in the insurance marketplace from enrollment restrictions can outweigh the gains from preventing the limited instances of gaming. The Massachusetts policy of having defined open enrollment periods, but allowing individuals who lose alternative coverage to purchase anytime on the exchange, balances costs and benefits by limiting the most egregious abuses while still providing access to the exchange for those whose circumstance have changed.

Dynamic behavior and consumer price sensitivity are related. Younger consumers are more likely to exit coverage and are also significantly more price-sensitive. It is plausible that these two facts are related. Some consumers may be unconcerned with the quality of their coverage because they do not anticipate holding that coverage for very long. Such consumers are likely to be highly sensitive to price.

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This may be the calculation made by younger consumers, who may simply be between jobs or feel unlikely to need coverage through the exchange for an extended period of time. By contrast, older consumers may be both more likely to be concerned about plan generosity and anticipate holding the coverage for longer (for example, an early retiree might plan to hold coverage via the exchange until they are eligible for Medicare).



**Figure 2: Probability of Remaining in the Exchange by Time Since Initial Enrollment.** Kaplan-Meier survival estimate. Sample: consumers over age 26 purchasing single-individual coverage who first enrolled in the exchange between July 2007 and Dec 2009. Data: transaction records, July 2007-Dec. 2009.

**Table 1: Hazard Ratio for Leaving the Massachusetts HIE, by Demographic Characteristics and Plan Type Chosen.**

	(1)	(2)	(3)
<b>Panel A: Demographics</b>			
Age 27-29	(Comparison Category)		
Age 30-34	0.825***	0.831***	0.859***
	(0.0255)	(0.0258)	(0.0279)
Age 35-39	0.727***	0.732***	0.755***
	(0.0259)	(0.0259)	(0.0278)
Age 40-44	0.705***	0.711***	0.728***
	(0.0248)	(0.0252)	(0.0269)
Age 45-49	0.637***	0.642***	0.659***
	(0.0221)	(0.0224)	(0.0242)
Age 50-54	0.629***	0.634***	0.652***
	(0.0230)	(0.0233)	(0.0251)
Age 55+	0.626***	0.632***	0.654***
	(0.0189)	(0.0193)	(0.0210)
Female	1.171***	1.173***	1.179***
	(0.0220)	(0.0221)	(0.0225)
<b>Panel B: Plan Characteristics</b>			
Bronze		0.962	
		(0.0268)	
Silver		0.904***	
		(0.0281)	
Gold	(Comparison Category)		
Fixed effects	geographic, date of enroll.	geographic, date of enroll.	geographic, date of enroll., plan chosen
N	18,083	18,083	18,083

Note: Cox Proportional Hazard Model. Sample: consumers over age 26 purchasing single-individual coverage who first enrolled in the exchange between July 2007 and Dec 2009. Data: transaction records, July 2007-Dec. 2009. Data: transaction records, July 2007-Dec 2009.

## 7. Adverse Selection into non-Mandated Benefits

When insurance plans vary in coverage level, more generous plans are likely to attract consumers with higher costs: adverse selection. A case study of demand for prescription drug coverage in Young Adult plans illustrates the danger of adverse selection in exchanges. In the exchange's Young Adult market, plans are less generous (and cheaper) than coverage available in the regular market. In particular, Young Adult plans are offered both with and without prescription drug coverage; in contrast, all tiered plans must offer drug coverage. Young Adult plans with prescription drug coverage are about \$25/month more expensive than such plans without prescription drug coverage.

We find that the type of consumer who chooses a young adult plan is the type of consumer more likely to use prescription drugs, as predicted by theories of adverse selection. (Lacking claims data, we cannot directly measure prescription drug use in this sample.) Enrollment data show that nearly 80% of female consumers choose plans with prescription drug coverage, compared to only 65% of male consumers. Women are known to use prescription drugs at a higher rate (Roe, McNamara, and Motheral 2002; Kaufman et al. 2002). In particular, for this age group, women are three times more likely than men to fill prescriptions for antidepressants and have higher rates of use for dermatologic agents, ulcer drugs, and oral contraceptives. (Roe, McNamara, and Motheral 2002). Moreover, even though insurers are not permitted to price differently by gender, insurance companies may still be able to price discriminate when setting the price of plans that disproportionately attract women versus men. We return to this theme when we discuss age-based pricing in the next section.

In the presence of adverse selection, more choice is not always a good thing: plans with prescription drug coverage cost more not only because prescription drug coverage is a valuable benefit, but because consumers who choose this coverage are likely to expect to spend more on prescription drugs. There is a tradeoff between value of additional choice and cost of the adverse selection. In other contexts,

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allowing more choice has led to a death spiral of more generous coverage; see Cutler and Reber 1998. The cost of adverse selection can be mitigated by an effective risk-adjustment scheme, in which firms receive higher payments for more costly enrollees. The ACA exchanges will contain a risk adjustment scheme—Massachusetts does not during this time period— but designing an effective risk adjustment program is difficult. (For instance, Brown, Duggan, Kuziemko, and Woolston 2011 argue that the Medicare Advantage risk adjustment system is ineffective.)

## **8. Imperfect Competition and Pricing Regulation**

Insurance markets are not perfectly competitive: market concentration has contributed to price increases (Dafny, Duggan, Ramanarayanan 2009) and there is substantial price variation for essentially identical products (see Starc 2011 and Maestas, Schroeder, and Goldman 2009 on the Medigap market). In the Massachusetts HIE, plans from different insurers are not perfect substitutes, even after the financial characteristics of plans in each tier were standardized. Beyond contractual features, the plans are differentiated in a number of ways: first, plans still vary in their network of physicians, even among standardized plans. Consumers may value the range of choice in one network over another, or may have a preference for continuing to see their current physician. Moreover, some consumers may value the brand name and reputation of the various insurers.

Because products are not perfect substitutes, price variation among plans on the Massachusetts HIE remains high. On average, for a given plan design, the most expensive plan costs about 50% more than the least expensive plan, holding constant the zip code and age of the enrollee. The ratio of the price of the most expensive to cheapest plan is relatively constant across ages and geographies. As a result, in dollar terms, price dispersion is largest for the oldest enrollees and most generous plans—a \$270/month range of prices for a gold plan for a 60 year-old, versus a \$109/month range for a bronze-low plan for a 30 year old.

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In a perfectly competitive market, insurers would not have the ability to price above marginal cost. However, under imperfect competition, a profit-maximizing insurer will set price equal to cost plus an additional markup term that is inversely related to the elasticity of demand for its product. Thus, if firms face very elastic demand (enrollment is very sensitive to price) they will charge low markups, but when demand is inelastic, high markups will result.

Insurers in the exchanges are allowed to price differentially based on age, and the existing literature assumes that this differential pricing will result from cost-differences by age. However, insurers can charge markups over cost, and the level of this markup will depend on how sensitive consumers are to price. Because older consumers are less price sensitive, insurers will be able to charge higher prices for older consumers even apart from differences in costs. In Ericson and Starc (2012b), we show that there is substantial variation in consumer preferences and that this variation is closely related to age. Younger consumers much more responsive to higher premiums than older consumers: a \$1 change in premium on the average consumer under age 45 has the same effect on choice as a \$3.50 price change on a consumer over age 45.

Moreover, because of modified community rating pricing regulations, premiums for different ages are linked. Massachusetts allows prices vary only within 2:1 bands, while the ACA will allow for an up to 3:1 ratio. Our research shows that consumers' differential response to price by age implies that the ratio of premiums of the oldest to youngest will exceed the ratio of these groups' healthcare costs. The extent to which the age-based pricing regulation will be binding depends not only on costs, but preferences and markups.

In simulations in Ericson and Starc (2012b), we find that compared to unrestricted prices, modified community rating has the potential to improve outcomes for consumers in this market. When insurers with market are limited in how they can vary prices across different groups of consumers, they

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set prices based on the *marginal* consumers who will change their decisions, rather than the *average* consumer. Because younger consumers are more likely to opt out their plans than older consumers, when restricted by modified community rating, insurers set prices that are lower overall than they would be if insurers could price entirely separately to different age groups. There is, however, a trade-off: younger consumers still face higher prices, even as average prices fall. This raises prices for younger consumers by approximately 8%, which is a considerable cost. Despite this trade-off, we find restrictions on age-based pricing increase total consumer welfare in the presence of an effective mandate to purchase insurance. We find that when age-bands are narrower (1:1 or 2:1, versus 3:1), the overall consumer surplus is higher—but so is the transfer away from younger consumers. However, in the absence of a mandate, substantial unraveling can occur under age-based pricing restrictions since younger consumers derive less benefit from holding insurance.

Modified community rating will also interact with other pricing and product regulation. Because minimum medical loss ratio regulations limit the extent to which insurers can charge markups, they can hold down prices for even younger consumers.<sup>9</sup> While Massachusetts had no loss ratio regulation, the ACA does. Our simulations show that the ACA regulation will reduce the transfers from the young to the old that result from the restrictions in modified community rating, while keeping still creating price pressure on insurers by making young consumers the marginal consumer to whom prices are set. Finally, we note that the definition of minimum creditable coverage is crucial, given that consumer demand is cluster at the lowest tier of generosity. Moreover, the absence of a mandate would lead to much higher premiums, especially for younger consumers, due to selection out of the market.

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<sup>9</sup> The ACA's minimum medical loss ratio regulation requires insurers to payout at least 80% of premiums on health care claims .

## 9. Conclusion

Health insurance exchange designers have many decisions to make, at both the legislative and agency level. Making wise decisions are crucial for the functioning of the market: the potential consequences of poor regulation are large, as insurance markets can fail to function without appropriate regulation. Fortunately, the Massachusetts HIE can shed light on consumer behavior, firm strategies, and the interaction of regulation on exchanges.

We have touched on a number of themes in this review of the Massachusetts evidence that will be revisited by exchange designers in other states. Consumers have difficulty trading-off attributes of complex insurance products, and so may rely on heuristics. Choice architecture will affect the market, and exchange designers can improve consumer satisfaction by providing an interface that simplifies and clarifies the tradeoffs. Standardization of benefits has the potential to intensify market competition, but it can also go wrong if the wrong plans are chosen. The dynamics of enrollee behavior provide information on the role exchanges play: are enrollees just choosing stop-gap coverage for brief periods, or do they rely on the exchanges as long-term sources of insurance? Insurance markets are imperfectly competitive, so more information than health costs is necessary when forecasting the level of prices and how prices vary between groups—preferences matter as well. Understanding how insurance firms price to preferences is crucial to understanding the effects of modified community rating and minimum medical loss ratio regulations.

States have substantial latitude in how the exchanges are designed and regulated. The Massachusetts HIE provides one model that has proven largely successful, even as it continues to evolve. Yet the Massachusetts insurance landscape differs from that in other states, as it had lower rates of uninsurance prior to reform. As other states develop their own versions of the exchanges, our understanding of exchange design will develop. Examining how variation between state exchange

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regulations relates to outcomes can help refine our knowledge of insurance markets and improve regulations, but states should not neglect the power of running their own experiments within an exchange.

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