IT ALL DEPENDS: "STICKER SHOCK" IN HEALTH INSURANCE REFORM

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Introduction

A major part of the "Affordable Care Act" (ACA) is a change in the market for insurance non-elderly people buy as individuals, using a combination of new subsidies and new federal regulatory rules. The reason for focus on this market is not its present quantitative importance—while "millions" buy coverage in this way it covers only 5% of the under 65 population—but rather because it is to be the vehicle by which the bulk of the currently uninsured will obtain insurance that discharges their obligation under the individual mandate, and the only vehicle for obtaining premium subsidies. They will generally obtain individual insurance through state-level Exchanges which in turn will be subject to new state and federal regulation.

While some of the ACA's changes can be interpreted as efforts to improve the apparently low efficiency, broadly defined, of this part of the insurance market (compared to group health insurance), they also are intended to achieve social goals of equity and redistribution across potential insurance buyers by age, sex, income, and indicators of risk. While we have raised questions about both the appropriateness of these goals and about whether the ACA's provisions achieve them in the most efficient way (Pauly, 2010; Harrington, 2009), in this paper we largely eschew normative judgments and instead try to assemble information that answers the question of whether the "price" (yet to be defined) of health insurance and health care for people who currently use or might use this market is affected by the way these changes are being implemented, concentrating on data from California and from the 36 states that will have federally run exchanges. We chose California because of its population size and because its new program has stimulated the most initial interest. Then we look at a larger population using federal exchanges as a larger sample which should be reasonably homogeneous in terms of exchange procedures and operations, and whose marketplaces have been less aggressive and less selective in choosing among plans to list.

We are interested in whether changes due to the ACA impact the price (averaged over some relevant population) for individuals obtaining ACA-compliant insurance on exchanges compared to levels paid before reform, and whether there are significant price changes around this average for different identifiable population subgroups.

We first show that there are serious challenges and limitations in scope to current attempts to make before-and-after "sticker shock" comparisons using only premium data (of whatever quality). In addition to imperfect data on posted premiums in the pre-ACA period, measures of the generosity and form of coverage are also lacking, leading to an "apples to oranges" comparison problem with specific plans to be offered on exchanges. Obviously, the premium for a very high deductible catastrophic policy will be lower than that for a very comprehensive policy with minimal cost sharing. While compelling some people to buy more comprehensive coverage than they would choose voluntarily would necessarily cause them to pay higher premiums, any analysis of the change in premiums should at least recognize that more comprehensive coverage pays for more medical costs. Our measure does that, albeit imperfectly.

Specifically, we propose that a relevant measure of price experienced on average (or in an expectations sense) by a buyer of insurance facing a risk of medical care spending is not just the insurance premium per se but also the expected amount of out of pocket payments (given whatever insurance coverage that premium buys). Moreover, measures of volume of purchases at a given premium are important for an evaluation. It is relatively inexpensive to file a premium for a given plan but many plans with posted premiums are purchased by few people—because of (pre-ACA) underwriting procedures, marketing differences, and consumer perceptions. There is not much point in considering a premium (or a pattern of coverage) no one buys. Our approach therefore tries to focus on a "transactions price" measure of price (rather than posted or quoted prices). In doing so, we distinguish between the change in "price" to

consumers who previously bought individual insurance and the change in "price" to those who formerly chose not to buy.

Before the ACA, private health insurance websites offered listings of multiple insurance options and their premiums. However, the premium posted on a website was not necessarily the premium a buyer would be charged, even after the buyer provided information on age, gender, location, and smoking status. This is because private insurance was medically underwritten, so premiums were lower for the good risk majority than for the high risk minority. Because of risk rating and because illness lowers disposable income it is likely that the part of the population which purchased risk-rated health insurance from private firms was lower risk on average than the full population of potential buyers on the new exchanges. We do not know what assumptions firms bidding on exchanges made about the risk level of the population they would attract, but it is likely that because of the post-ACA prohibition on underwriting (for anything but smoking) and guaranteed issue means that insurers priced coverage in expectation of attracting a higher risk population. So we expect that the population of previous buyers as a whole will experience an increase in premiums for each level of coverage and therefore modestly higher premiums and total spending. [1]

Using what we regard as appropriate measures (though with somewhat imperfect data), we find that the overall effect of reform on prices paid by previous individual insurance purchasers, before taking subsidies into account, is not as large as many of the estimates from opponents of the ACA, but is very likely to represent a moderate increase on average. Perhaps more strikingly, we find that some groups of previous purchasers are experiencing increases in prices of up to 40 percent, while others benefit

[1] We collected data on premium quotes and benefit design in 2013 from healthcare.gov in an effort to characterize pre-ACA coverage levels, but the dual challenges of accounting for underwriting and measuring the volume of transactions led us to focus on survey-based measures of insurance coverage to measure prices in the pre-ACA period. A report by the Society of Actuaries (2013) uses survey based measures of coverage and utilization to project higher average costs per insured in the individual market post-ACA due to an assumed increased utilization of medical care by the previously uninsured and gravitation of persons previously insured in state or federal high risk plans into the exchanges.

from very modest cuts. But the financial impact of reform is much more striking for the formerly uninsured. Those who formerly went without insurance, especially the surprisingly large number with household incomes high enough to make them ineligible for subsidies, will experience a large increase in cost. For many of the uninsured, this shock is tempered by subsidies but, even so, one that will leave many paying more than previously. These price increases for the formerly uninsured may occur in part because hospitals and other providers will now require payment of cost sharing for services previously written off as bad debt or classified as charity care, because ACA insurance makes that cost sharing "affordable."

What Do We Mean by a Price Change for Insurance?

Insurance, in economics, is not a commodity with a price and a quantity. Instead, the premium reflects total spending for dollars to be delivered in states specified in the policy; it is analogous to a measure of total spending (price times quantity) per buyer. Hence one needs to look both at the premium and the expected financial benefits (and any other managed care limits) associated with the policy it buys.

There are at least two alternative ways of looking at whether the new premiums that will be charged for different kinds of health insurance plans in an exchange (such as the California exchange, named Covered California) differ from previous premiums. One way is to look at premium *opportunities* for potential buyers: how does the set of premiums and products after reform compare with the set of premiums and products available before reform for the full set (whatever it is) of consumers before and after reform. This set presumably includes people without an attractive group insurance option, some of whom previously decided to buy individual insurance and some of whom decided to remain uninsured. There is obvious imprecision both in defining this population and measuring the "opportunities" offered from a range of insurers. The alternative which we follow is to divide the problem into two parts: focus on those who did purchase individual insurance in the prior period (a

defined population) and compare what they paid and received in that period with an estimate of what they might pay and buy in the post-reform period. Then we examine those who did not obtain insurance in the prior period and estimate the financial consequences of reform for them (compared to pre-reform situations). Since the division of a population of potential buyers into these two parts is a function of the premium and coverage options they face, there will be a remaining endogeneity problem.

Prior Attempts to Evaluate Sticker Shock

The ACA's potential impact on insured medical costs and premiums has been controversial since the legislation was introduced. The U.S. Congressional Budget Office (CBO) analysis of the Senate bill that essentially became the ACA projected that broader coverage requirements and attendant increases in utilization of medical care would increase average premiums (before subsidies) for the individual market by 10 to 13 percent by 2016 compared with prior law, without considering potential adverse selection (U.S. CBO, 2009). The CBO projected increase was 27 to 30 percent exclusive of assumed savings in administrative costs from the new market rules and an assumed shift toward younger buyers. In contrast, two industry sponsored studies projected much larger increases in medical costs and premiums from increased utilization and adverse selection associated with the new rating rules and relatively low penalties for violating the individual mandate (Oliver Wyman, 2009; Price Waterhouse Coopers, 2009).

The announcement of individual market premium rates for coverage in the exchanges has spawned a variety of comparisons to pre-reform rates. This largely informal literature commenced with California, which was one of the first states to publish its exchange premiums and details of coverage. The main challenge in such comparisons is to find a measure of premiums and coverage in the prior period. Different plans offer coverage that differs in at least two important dimensions: the expected insurance

benefit payments relative to total payments for covered services (the "Actuarial Value" [AV] of the insurance), and non-financial dimensions of coverage like the form and breadth of a PPO network, which physicians in the network are accepting new patients, and the aggressiveness of insurer rules for coverage that may deny payment for covered services. Especially in California, it is appropriate to say that a major challenge is an "oranges-to-oranges" comparison of insurance products.

Those who initially claimed that reform dramatically raised prices in California used as their comparison the exchange premiums for the relatively modest number of Bronze and Silver plans it offers (almost all managed care or PPO in some fashion) compared to selected premium quotations on health insurance websites in the current period, but without necessarily controlling for their generosity of coverage or type of managed care. Roy (2013a), for example, compared the premiums announced for Bronze plans on the California exchange with the lowest premiums (for people of a given age and gender) on health insurance websites. But, even apart from selective underwriting, the lowest premiums on the website are likely to reflect less generous coverage than the lowest premium exchange plan, so this comparison would lead to an overestimate of the "coverage adjusted" sticker shock. An alternative conclusion from California exchange management was that reform lowered premiums, based on a comparison of individual market exchange premiums for Bronze and Silver plans to premiums for small group insurance (Covered California, 2013). But small group coverage could on average be more generous than the Bronze and Silver exchange plans.

On their face, both of these comparisons are lacking. The low premiums on websites were for plans which could have higher levels of cost sharing than the comparison plans in the exchange and subject to underwriting rules which may make them unavailable to higher risk people who are guaranteed access to coverage in the exchange, and the generosity of group insurance is usually greater than that of even the "Silver" exchange premiums.

Following up on Roy's initial analysis of California, the Manhattan Institute used data available from the finder.healthcare.gov website to calculate for six age-gender cohorts average pre-ACA premiums for the five lowest premium plans in the most populous zip code in each county and state (Manhattan Institute, 2013). Using "denial" and "surcharge" data from the government website, a weighted average rate was calculated for each cohort assuming a 75 percent premium increase for those surcharged and that those denied found coverage at three times the original rate. The statewide average of the adjusted rates for each cohort was then compared to the average exchange premium across counties for the five cheapest plans in each state. Based on this comparison, the average rates for the exchanges were 41 percent higher than the pre-ACA adjusted rates, with substantial variation across states (Roy, 2013b).[2]

It might be argued that premium comparisons of these sorts provide useful information on the magnitude of premium changes that some buyers might face due to the ACA. At a minimum, however, a fuller analysis of the ACA's financial effects on health insurance buyers requires some consideration of potential ACA-induced changes in the generosity of coverage. There exist serious data challenges in identifying similar plans and similar populations for undertaking such analysis. There is, as far as we know, no large sample of pre-ACA data on private insurance premiums, details of coverage (or the actuarial value), and market shares of different plans for California or other states. For example, sources like the Medical Expenditure Panel Survey (MEPS) that provide some (though not all) information on

[2] The Manhattan Institute (2013) also estimated the number of subsidy eligible persons in each state and the break-even income levels at which premium tax credits would produce a decrease in premiums net of subsidies. In another analysis, the American Action Forum (Cappellanti, 2013) compared by state, without adjustment for coverage generosity or underwriting, the lowest 2014 rate available in each state's exchange for a 30 year-old male to the lowest pre-ACA rate and reported an average increase above 200 percent. Around the same time, the ASPE Office of Health Policy (2013) of the U.S. Department of Health and Human Services reported that the weighted-average premium for the second lowest cost silver plan for 47 states and the District of Columbia was 16 percent below the projected average premium obtained by the ASPE using the CBO projection methodology.

coverage do not provide premiums, and sources like the survey of consumer expenditures that provide premiums do not provide details of coverage.[3]

The Problem and a Simple Model

The ideal data to answer the question posed would have detailed information for a large sample on premiums paid and quoted, the details of coverage (including provider networks), and the risk levels and preferences of each buyer. As far as we are aware, there is no such data for a representative population in California or nationwide for the pre-reform period. Proprietors of websites sometimes know which buyers used their websites to buy which products, but that is by no means representative of all potential or actual buyers, and they do not know the premium finally charged (after underwriting adjustments).

The largest sample survey of individual health insurance purchases in California and other states comes from the Census Bureau's *Current Population Survey*. In addition to demographics, this survey asks respondents annual premiums paid and annual total out of pocket spending on health care, including both premiums and out of pocket payments at the point of use.

We begin our analysis by outlining some simple models of insurance options and consumer demand, beginning with a descriptive model of the changes in financial flows and moving on to add utility functions with varying risk aversion. We first develop a representative buyer model, and then modify it to add heterogeneity in demand arising from variations in risk aversion and expected benefits.

The Buyer's Perspective: Descriptive Model

The ideal economic evaluation of "sticker shock" would be a calculation of the change in welfare for different population groups caused by the ACA, where the change in welfare is related to the varying

[3] The U.S. General Accounting Office (2013) summarizes individual market coverage terms by state using data reported by carriers to the U.S. Department of Health and Human Services, but the data do not include market shares of different plans.

characteristics of insurance discussed above. Rather than tackle this complex problem, we begin with a key (though not the only) measure of what ACA means to a consumer: its effect on the expected total payments that consumer will make for insurable health care. This is an appropriate measure of welfare for buyers who are risk neutral and do not have preferences over the form of care delivery. Each such buyer then evaluates an insurance offering in terms of its expected or actuarial value: how many dollars on average will it deliver to someone like me? Regardless of the premium, the value of a given insurance policy is then related to the expected value of out of pocket payments after its coverage provisions take effect. Despite the insurer's premium loading for administrative expenses and projected profit, which will make individual insurance premiums before and after reform higher than actuarially fair on average, some consumers did buy insurance in the pre-reform period. For these buyers, the main question then is how their financial outcomes would be expected to differ in the pre-and post-reform periods.

Given our assumptions, an insurance plan can be evaluated in terms of its "Total Expected Price" (TEP), defined by:

$$(1) \quad TEP^* = P^* + OOP^*$$

where P* is the average premium paid by persons in a given subgroup, OOP* is the average expected amount paid out of pocket, and TEP* is the sum of the "average person's" premium and the average person's expected value of out of pocket payments.

This definition automatically "quality adjusts" for variations across insurance plans and people in cost sharing (explicit and implicit): someone who pays a low premium for a plan because it has high cost sharing should have higher out of pocket payments on average than someone who pays a high premium for a more generous plan. It represents a complete summary of the consequences of health reform for a

given population subgroup in terms of expected financial costs (and the expected amount left over for other spending out of a given level of income).

For buyers, TEP incorporates both the differences in premia and the differences in OOP from the pre- to the post reform period. For nonbuyers (the uninsured), we use the same definition, but now the premium in the pre-reform period is zero. However, the uninsured may not suffer the full cost of care they use because of both charity and bad debt care. In this sense, they have an "insurance" policy with zero premiums and whatever distribution of OOP they experience (and that "policy" has an actuarial value that can be compared to the post-ACA policies with which we are comparing).

The relationship of insurance to network breadth is more complex: two plans with the same within-network cost sharing but different degrees of generosity for out of network providers will presumably display on average different out of pocket payment levels, as people in the narrower network go outside more frequently and pay more. Thus some trace of the consequences of network generosity appears in data on out of pocket payments.

Regarding risk preferences, the TEP is a full summary of the consequences of the ACA for risk neutral consumers. However, we do not know about utility effects when risk averse consumers—even one with low risk aversion who chooses to forego coverage—decide not to use care. And obviously, as a measure of expected value, the change in TEP does not take into account impacts on risk and expected utility. It is, however, a measure of the redistributional consequences of health reform. While this measure will capture the full financial impact of differing insurance coverages in a setting where the amount and type of medical spending (the loss distribution) is given for any individual, the possibility of behavioral responses (moral hazard) may make the comparison even more complex. This will be discussed in more detail below.

The benchmark comparison of price before and after reform for any individual is then a comparison of TEP before (which can be observed in data available to us) and an estimate of TEP afterwards, which requires assuming that some exchange plan with a given premium is selected and then using an estimate of its AV for the consumer to get a predicted value of the associated out of pocket payment.

The Buyer's Perspective: Behavioral Model

The story so far is just asking what assumptions might make it possible to calculate a measure of the distribution of net average financial effects. However, a full economic model will take account of buyers' utility function and a chance to behave differently before the ACA depending on that utility function and what prices they face in the two environments.

The conventional way to think about risk aversion is to imagine that consumers have (potentially different) "risk premiums": amounts they would pay for insurance in excess of the actuarially fair premium rather than go without insurance entirely, often stated as a percentage of that premium. Knowing this risk premium for a given actuarial value allows us to predict whether or not they will buy given coverage at some loading percentage. With an opportunity to buy different levels of coverage, the level of coverage the person will choose depends on the loading. With a constant proportional loading, the optimal level of coverage, for a given distribution of risk, is that level at which the difference between the risk premium and the loading, times the actuarial value of the policy, is maximized. At this level the net consumers' surplus is maximized.

The behavioral implication is that people with higher risk premia facing the same premiums for the same set of coverage opportunities are more likely to choose positive coverage voluntarily and to choose more generous coverage. If we only knew the details of coverage, we might infer the distribution of risk premia from the different choices people with given risk characteristics make facing different sets of premiums. But with only data on total premiums paid and out of pocket payments (but no data on

expected claims), we cannot directly distinguish a generous plan from an overpriced plan. What we can do is calculate average out of pocket spending for subpopulations for people who paid different premia and, assuming similar expected total expense, use that to calculate the average AV as a function of premiums. This may be circular but if price variation is similar (around the mean) at each AV it may be a reasonable estimate.

So among pre-ACA buyers paying (say) about $200 a month and having an AV of 75%, we can conclude that their risk premia are at least high enough to make this purchase attractive. Because loadings on average may decline as coverage generosity increases (e.g., Litow, et al., 2012), this approach will tend to overstate risk premia for people choosing plans with low cost sharing, and thus overstate any utility improvement from more generous coverage following the ACA. The other behavioral dimension is shopping behavior. In both the pre-reform and post-reform periods, it is probably not realistic to imagine that every buyer will choose the lowest priced seller of policies with given explicit cost sharing, even ignoring possible variations in care networks and other "non-coverage" dimensions. We therefore offer comparisons of pre-ACA TEP with post-ACA TEP estimated using the lowest premium and the median premium available to the person in his or her location for silver coverage. We also make comparisons to the lowest Bronze premium to examine the least expensive insurance option.

In the pre-reform period, the lowest premium insurer after underwriting may choose not to offer coverage or may increase the premium based on some risk factors. However, since our data are on transactions (for those who buy coverage), we know what they paid. For those who did not buy coverage it is harder to know what their pre-reform price options were since they depended not only on what is quoted on insurance websites or filed with the state but also on underwriting. In the post-reform period there is to be no underwriting (at least at the time of open enrollment) but buyers still

may have preferences for one seller over another, or just make mistakes and pay too much even though the exchange provides information on premiums.

Preliminary Results

California. To provide a comparison to pre-ACA TEP, we use minimum and median exchange premiums, as noted above. We estimate pre-ACA premiums and OOP using CPS data for 2011 and 2012 combined. To estimate average OOP in the post-ACA period, we apply benchmark bronze and silver premium policy provisions to the distribution of insurable expenses for the individually insured for the period 2005-2011, taken from the MEPS, and then adjust that national average amount by a California adjustment factor reflecting the difference in average health care costs between California and the national average. We used data from multiple years because the sample size for spending for the individually insured in any one year is small; we adjusted spending for inflation in health care prices. Sample sizes are shown in appendix table 2. (We discuss the results of using some alternative methods of estimating post–ACA OOP in the sensitivity analysis below.)

Table 1A shows average annual premiums paid and out of pocket payment (OOP) for age-sex combinations for those who chose to buy individual insurance in California in the pre-ACA and post-ACA periods for the full population of purchasers. We also show the percentage changes in average premiums, average OOP, and average TEP in Table 1B.

The overall pattern suggests a modest increase in average TEP for all former purchasers, on the order of 11 to 19% compared to the minimum premia, and 30% using the silver plan median premium. Bronze plan premia were generally lower than what people paid in the pre-ACA period, and silver plan premiums higher. Findings that many pre-ACA plans posted on websites would have coverage below the minima for post-ACA plans suggest that such “inferior” plans were not purchased as frequently as plans with similar or better (than bronze) actuarial values, at least in terms of out of pocket payments.

The changes in TEP by demographic groups are probably somewhat imprecise given the fairly small sample sizes in the CPS, which might result in missing the few rare high spending cases. Nevertheless, the patterns appear reasonable. For men, we note that both pre-ACA premiums and OOP rise with age, though much more strongly at the upper end of the age distribution. The result of reform is a modest reduction in TEP for the oldest ten-year-age interval for men, but an increase for all younger men, concentrated in the 45 to 54 age group. For women buyers, both premiums and OOP are higher than for men up to age 55, but they tend be flatter as a function of age, and especially to increase by a smaller percentage amount for women of childbearing age who would benefit from community rating.[4]

Sensitivity analysis. Spending data for the individually insured in California in the pre-reform period will reflect the provisions and policies of those plans, and health reform is intended in part to reduce some of the restrictions imposed by such plans. So an alternative spending distribution that will reflect fewer restrictions is the spending distribution for all privately insured (both individual and group coverage) persons in the MEPS (adjusted to California prices). This is also a much larger annual sample, so we can make it contemporaneous with the CPS data. This measure (data not shown) yields a moderately larger estimate for the average change in TEP in California, with the average increase in TEP using minimum bronze and silver premiums now at 16 and 24%, and the increase using the median silver plan premium at 34% (not shown). The overall pattern of changes in TEP across demographic subgroups is very similar to that in Table 1.

Federal Exchange states. We also looked at the larger sample of previously insureds in states where the exchanges are to be federally managed. Those exchanges may follow different policies in terms of choosing what plans to be offered, and probably will be less aggressive in seeking out low cost plans than in California. And obviously the populations and medical delivery systems may differ in those

[4] These patterns are consistent with analysis of variation in aggregate medical spending by age for males and females (Yamamoto, 2013)

states. We show average changes in premiums, OOP, and TEP for these states, where post-ACA premiums are a (weighted) average of premiums posted on the exchanges and post-ACA OOP is estimated using the spending distribution for the individual insureds in these states for the period 2005-2011, with state specific price adjustments.

Results are shown in Tables 2A and 2B. The overall impact of reform on TEP in this set of states is quite similar to that in California. TEP is estimated to increase from 13 to 18% using the minimum silver and bronze premiums, and by 23% using the median silver premium. The average percentage changes in minimum premia are also very similar, but the median silver premium increases by a moderately smaller percentage (29% vs. 36%), as does average OOP.

The patterns in the demographic subgroups are somewhat less clear despite the larger sample sizes. TEP now increases (rather than declines) for the oldest men at the minimum bronze premium, and the increase for young women is now about average, not lower. There is still a moderately large increase in TEP for older women, and an anomalously larger decrease for middle aged men (45-54) relative to younger men. These differences may be due to differences in the risk levels of people who bought individual coverage in these states in the pre-ACA period relative to what insurers are forecasting after reform. In particular, it may be (and examination of self-reported health status data in CPS confirm) that relatively more higher risk older people, especially men, bought individual coverage in California compared to the Federal Exchange states.

Sticker Shock for the Uninsured

The uninsured population is intended to be the primary beneficiary class for health reform. Two benefits are supposed to occur, but they are somewhat inconsistent with each other. On the one hand, insurance is to increase "access" to care by lowering out of pocket payment, and thus causing use of larger amounts of beneficial care. On the other hand, insurance is to provide financial protection

against episodes of high medical bills. The potential inconsistency arises because higher spending (as access increases) could increase out of pocket costs if the "new" insurance contains significant cost sharing, as bronze and silver plans do.

The policy exemplar of an uninsured person is one who faces the risk of paying out of pocket for all of their medical care, which means either high financial risk (if care is used) or reduced access (if it is not). But the combination of charity and bad debt care, combined with the effects of incentives to seek out free care at emergency departments of hospitals, mean that the uninsured as a group do not either face or pay the full market price paid by insured patients. Somewhat surprisingly, this use of free or subsidized care even applies to the large minority of uninsured people who have incomes high enough that they could "afford" insurance (Bundorf and Pauly, 2006). So the relevant analysis of the financial consequences (though not the welfare consequences) from health reform that results in insurance purchase for this population compares their actual out of pocket payment when uninsured with the combination of premiums and out of pocket payments they will face under bronze and silver plans after reform.

We divide the sample of previously uninsured people in the CPS based on income. The impact of paying premiums will fall more heavily on those who receive no or only modest subsidies, so we divide the sample at the income level representing 300% of the federal poverty line. This is approximately the level at which subsidies become negligible or zero, especially for younger people who pay lower premiums and hence are less likely to hit the "percentage of income" target at which subsidies begin. We only present changes in gross TEP here, without taking account of premium or cost sharing subsidies, so the analysis of the "non-low-income" (over 300% of poverty) may be most relevant.

Tables 3A and 3B use California data to compare average out of pocket payments for the uninsured with premiums and expected out of pocket payments under bronze and silver plans. Here we use the

spending of the currently privately insured population (group and nongroup) to estimate post-ACA OOP, because that sample, dominated by group insureds, would generally not have been subject to individual underwriting. This sample may still be missing some high risks among the formerly uninsured who would not have been able to work.

Low income uninsured in California. We provide data on change in TEP for this population primarily as a comparison group for the non-low-income uninsured. This population is about 70% of the uninsured in the CPS. The overall pattern is clear and unsurprising: in terms of average total financial payment, these uninsured people paid much less when they were uninsured than the premiums and out of pocket payments they are forecasted to experience after reform. The average OOP even with silver coverage is still higher post reform (before cost sharing subsidies) than pre-reform.

Non-low-income uninsured in California. As would be expected, average annual OOP before reform is somewhat higher for this population than for the low income population ($550 vs. $343), but it is still only a fraction of the total cost of care they received (estimated to be about $1500 in the MEPS). Apparently, charity, subsidized, and bad debt care is also received by this population.

The change in TEP for this population also represents a very large increase. Not only would members of this population now be paying premiums, but the out of pocket payments even with insurance coverage are several multiples of pre-ACA out of pocket payments. The variance of those payments will presumably be lowered by the regulations applied to post-ACA policies, but the means will rise considerably. One would also expect that much if not most of these OOP amounts will be collected, since health reform does not envision further charity care or special forgiveness for bad debts once non-low-income people have coverage defined to be adequate.

Federal Exchange states. Tables 4A and 4B show similar calculations for the federal exchange states, with very similar results. Gross TEP is substantially higher for the population that will receive minimal

subsidies. The prior period out of pocket payment for this population is somewhat greater than that for California, but it is still generally below the OOP estimates if this population were insured.

The very low OOP measures in the CPS data for the non-low-income uninsured are of concern. Could there be mismeasurement here? One would not expect substantial under-reporting of high out of pocket payments. Moreover, the pattern of OOP within these populations is related to income, age, and poorer self-reported health, so there does not appear to be randomness in the responses.

One other possibility is that there appear to be large changes in total spending associated with insurance coverage. Either demand-side moral hazard or supply-side response to ability to collect insurance payments may cause more and more costly care to be rendered. This increased spending means that, even with a somewhat higher proportion of spending covered by silver plans (the implied "actuarial value" of free care is on the order of 37%), a smaller fraction of a larger base is associated with OOP levels that increase rather than fall.

Conclusion

This analysis of the change in total expected payment for those to be covered in post-ACA exchanges tells rather different stories about "sticker shock." On the one hand, among those who previously bought individual coverage, premiums generally increase only modestly if they choose the plans with the lowest bronze or silver premiums. While bronze premiums are lower than what was paid before, however, estimated out of pocket payments are higher, so the net effect is a moderate increase in TEP. If people choose to pay the median silver premium, the increase will be larger, but (at 25-30%) is still much lower than some of the estimates from the informal literature.

The sticker shock story is much different for the previously uninsured. The low income previously uninsured will have subsidies to cover much of the higher premiums and cost sharing to which they will

be subject. But the previously uninsured who will receive minimal subsidies, who constitute a sizeable fraction of the uninsured population, are estimated to experience a very large increase in financial responsibility. Not only will they have to pay significant premiums but, because of increases in total utilization because of moral hazard or greater willingness of providers to supply care, their responsibility for out of pocket payment will also increase. They will pay a slightly smaller fraction of their total cost of care than when they were uninsured, but the total cost will increase to such an extent that the financial burden will rise.

We have not provided welfare calculations for this population. Such calculations would reduce the change in TEP by an estimate of the value to them of additional care (but by something less than the cost of that care), and by a small reduction in the risk of very high levels of OOP. One reason for this large increase in TEP is the small average OOP for the non-low-income uninsured in the CPS data, and this data may have underestimated the relatively rare event of a high out of pocket payment. Even so, it seems that this is the population that will be subject to the most severe financial shock from health reform.

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Table 1A. Prices pre-ACA and post-ACA in California

	Pre-ACA			Post-ACA								
				Bronze (min premium)			Silver (min premium)			Silver (median premium)		
Group	Annual premium (mean)	Annual OOP (mean)	Annual TEP (mean)	Annual premium (mean)	Annual OOP (mean)	Annual TEP (mean)	Annual premium (mean)	Annual OOP (mean)	Annual TEP (mean)	Annual premium (mean)	Annual OOP (mean)	Annual TEP (mean)
Men												
25 to 44	2,681	613	3,295	2,363	928	3,291	2,954	691	3,645	3,282	691	3,973
45 to 54	3,250	666	3,916	3,539	976	4,514	4,423	766	5,189	4,915	766	5,681
55 to 64	6,075	1,764	7,839	5,246	1,825	7,072	6,558	1,216	7,774	7,287	1,216	8,503
All men	3,666	913	4,578	3,636	1,205	4,841	4,545	860	5,405	5,050	860	5,910
Women												
25 to 44	3,043	946	3,988	2,333	1,863	4,196	2,916	1,311	4,227	3,240	1,311	4,551
45 to 54	4,122	1,280	5,402	3,570	2,400	5,970	4,463	1,643	6,106	4,959	1,643	6,601
55 to 64	5,295	1,693	6,987	5,362	2,572	7,934	6,702	1,708	8,410	7,447	1,708	9,155
All women	4,165	1,312	5,477	4,014	2,288	6,302	5,018	1,557	6,575	5,298	1,557	6,856
TOTAL	3,911	1,109	5,020	3,815	1,753	5,568	4,768	1,213	5,981	5,298	1,213	6,511

Table 1B. Percentage changes in prices in California

	TEP			Premiums			OOP	
Group	Bronze (min) vs. Pre-ACA	Silver (min) vs. Pre-ACA	Silver (median) vs. Pre-ACA	Bronze (min) vs. Pre-ACA	Silver (min) vs. Pre-ACA	Silver (median) vs. Pre-ACA	Bronze vs. Pre-ACA	Silver vs. Pre-ACA
Men								
25 to 44	-0.1	10.6	20.6	-11.9	10.2	22.4	51.2	12.6
45 to 54	15.3	32.5	45.1	8.9	36.1	51.2	46.6	15.1
55 to 64	-9.8	-0.8	8.5	-13.6	7.9	19.9	3.5	-31.0
All men	5.7	18.1	29.1	-0.8	24.0	37.8	32.1	-5.8
Women								
25 to 44	5.2	6.0	14.1	-23.3	-4.2	6.5	97.0	38.6
45 to 54	10.5	13.0	22.2	-13.4	8.3	20.3	87.4	28.3
55 to 64	13.5	20.4	31.0	1.3	26.6	40.6	51.9	0.9
All women	15.1	20.1	25.2	-3.6	20.5	27.2	74.4	18.7
TOTAL	10.9	19.1	29.7	-2.5	21.9	35.5	58.1	9.4

Table 2A. Prices pre-ACA and post-ACA in Federal Exchange states

	Pre-ACA			Post-ACA								
				Bronze (min premium)			Silver (min premium)			Silver (median premium)		
Group	Annual premium	Annual OOP	Annual TEP	Annual premium	Annual OOP	Annual TEP	Annual premium	Annual OOP	Annual TEP	Annual premium	Annual OOP	Annual TEP
Men												
25 to 44	2,673	722	3,395	2,294	1,001	3,295	2,818	741	3,559	2,958	741	3,699
45 to 54	3,857	1,306	5,162	3,368	1,051	4,419	4,112	824	4,936	4,329	824	5,154
55 to 64	4,497	1,262	5,759	4,879	1,949	6,828	5,972	1,299	7,271	6,283	1,299	7,582
All men	3,642	1,076	4,719	3,464	1,294	4,758	4,240	921	5,162	4,460	921	5,381
Women												
25 to 44	2,590	795	3,385	2,208	1,976	4,184	2,698	1,409	4,107	2,843	1,409	4,252
45 to 54	3,949	1,513	5,462	3,454	2,534	5,988	4,244	1,741	5,986	4,468	1,741	6,209
55 to 64	3,955	1,718	5,673	5,038	2,726	7,765	6,185	1,820	8,005	6,486	1,820	8,306
All women	3,619	1,427	5,046	3,845	2,422	6,267	4,718	1,661	6,379	4,955	1,661	6,617
TOTAL	3,632	1,238	4,870	3,638	1,865	5,502	4,458	1,295	5,753	4,686	1,295	5,981

Table 2B. Percentage changes in prices in Federal Exchange states

Group	TEP			Premiums			OOP	
	Bronze (min) vs. Pre-ACA	Silver (min) vs. Pre-ACA	Silver (median) vs. Pre-ACA	Bronze (min) vs. Pre-ACA	Silver (min) vs. Pre-ACA	Silver (median) vs. Pre-ACA	Bronze vs. Pre-ACA	Silver vs. Pre-ACA
Men								
25 to 44	-2.9	4.8	9.0	-14.2	5.4	10.7	38.7	2.7
45 to 54	-14.4	-4.4	-0.2	-12.7	6.6	12.3	-19.5	-36.8
55 to 64	18.6	26.3	31.7	8.5	32.8	39.7	54.5	3.0
All men	0.8	9.4	14.0	-4.9	16.4	22.5	20.2	-14.4
Women								
25 to 44	23.6	21.3	25.6	-14.8	4.1	9.8	148.6	77.3
45 to 54	9.6	9.6	13.7	-12.5	7.5	13.1	67.5	15.1
55 to 64	36.9	41.1	46.4	27.4	56.4	64.0	58.7	5.9
All women	24.2	26.4	31.1	6.2	30.3	36.9	69.7	16.4
TOTAL	13.0	18.1	22.8	0.2	22.8	29.0	50.6	4.6

Table 3A. Prices pre-ACA and post-ACA in California among previously uninsured, income ≤ 300% FPL

	Pre-ACA	Post-ACA				
		Bronze (min premium)			Silver (min premium)	
	Annual OOP	Annual premium	Annual OOP	Annual TEP	Annual premium	Annual OOP	Annual TEP
Men							
25 to 44	300	2,352	1,160	3,512	2,940	842	3,782
45 to 54	406	3,464	1,577	5,041	4,330	1,091	5,421
55 to 64	164	5,069	2,317	7,385	6,336	1,560	7,896
All men	307	2,998	1,464	4,462	3,748	1,028	4,776
Women							
25 to 44	489	2,388	2,137	4,526	2,985	1,485	4,471
45 to 54	247	3,527	2,096	5,623	4,408	1,461	5,869
55 to 64	329	5,109	2,743	7,852	6,386	1,815	8,200
All women	399	3,189	2,236	5,425	3,986	1,538	5,525
TOTAL	343	3,072	1,878	4,951	3,840	1,302	5,142

Table 3B. Prices pre-ACA and post-ACA in California among previously uninsured, income > 300% FPL

	Pre-ACA	Post-ACA				
		Bronze (min premium)			Silver (min premium)	
	Annual OOP	Annual premium	Annual OOP	Annual TEP	Annual premium	Annual OOP	Annual TEP
Men							
25 to 44	614	2,352	1,402	3,754	2,940	994	3,934
45 to 54	459	3,520	1,954	5,474	4,400	1,325	5,724
55 to 64	408	5,179	2,635	7,813	6,473	1,731	8,204
All men	534	3,226	1,885	5,111	4,033	1,282	5,315
Women							
25 to 44	574	2,346	2,181	4,527	2,933	1,500	4,433
45 to 54	771	3,448	2,475	5,923	4,310	1,635	5,946
55 to 64	312	5,125	3,011	8,136	6,406	1,961	8,368
All women	577	3,267	2,485	5,752	4,083	1,661	5,744
TOTAL	550	3,261	2,183	5,444	4,076	1,470	5,546

Table 4A. Prices pre-ACA and post-ACA in Federal Exchange states among previously uninsured, income ≤ 300% FPL

	Pre-ACA	Post-ACA					
		Bronze (min premium)			Silver (min premium)		
	Annual OOP	Annual premium	Annual OOP	Annual TEP	Annual premium	Annual OOP	Annual TEP
Men							
25 to 44	416	2,354	1,243	3,597	2,942	899	3,841
45 to 54	521	3,449	1,678	5,126	4,311	1,162	5,473
55 to 64	541	5,138	2,452	7,591	6,423	1,659	8,082
All men	458	3,004	1,560	4,564	3,755	1,096	4,850
Women							
25 to 44	444	2,360	2,258	4,618	2,950	1,586	4,536
45 to 54	476	3,487	2,225	5,712	4,359	1,558	5,917
55 to 64	428	5,123	2,897	8,021	6,404	1,928	8,332
All women	449	3,070	2,364	5,434	3,838	1,640	5,478
TOTAL	454	3,030	1,992	5,022	3,788	1,388	5,176

Table 4B. Prices pre-ACA and post-ACA in Federal Exchange states among previously uninsured, income > 300% FPL

	Pre-ACA	Post-ACA				
		Bronze (min premium)			Silver (min premium)	
	Annual OOP	Annual premium	Annual OOP	Annual TEP	Annual premium	Annual OOP	Annual TEP
Men							
25 to 44	409	2,382	1,501	3,882	2,977	1,059	4,036
45 to 54	518	3,550	2,079	5,629	4,438	1,409	5,847
55 to 64	2,166	5,220	2,786	8,006	6,525	1,839	8,364
All men	805	3,270	2,005	5,275	4,088	1,365	5,452
Women							
25 to 44	1,110	2,392	2,311	4,703	2,990	1,599	4,589
45 to 54	839	3,559	2,625	6,183	4,448	1,739	6,187
55 to 64	1,007	5,211	3,177	8,388	6,513	2,085	8,599
All women	1,010	3,414	2,631	6,045	4,268	1,767	6,035
TOTAL	878	3,321	2,315	5,637	4,152	1,564	5,716

Appendix 1. Description of Post-ACA OOP Estimation Method

1. Adjust MEPS total health spending for differences between California and other states. To adjust national spending to California, we multiply total spending of each MEPS observation by 0.9125, based on the assumption that spending in California is 90 percent of that in other states (using the means of OOP in the CPS) and California is one eighth of the national population (0.9125=0.9*(7/8)+1*(1/8)). To adjust national spending to the Federal Exchange states, we multiply total spending of each MEPS observation by 1.0138 using the same assumptions (1/0.9)*(1/8)+1*(7/8)).

2. Inflate geographically-adjusted OOP spending from step 1 to 2014 dollars using the all-items price index for urban consumers from the Bureau of Labor Statistics (BLS).

3. Calculate actuarial value by age and sex using spending from step 2 for the privately insured population in the MEPS (individual market only) and the representative benefit design of Bronze and Silver plans. To increase sample size, we pool years 2005 through 2011 from the MEPS, which yields 1,313 observations with full-year insurance coverage in the individual market. For benefit design, we use a $6,350 OOP maximum in both metal tiers, a Silver deductible of $1,500 and a Bronze deductible $3,000, and Silver coinsurance of 20 percent and Bronze coinsurance of 40 percent. We perform this calculation on records in the MEPS above 138 percent of poverty and are between ages of 27 and 64. We also exclude people who either have public coverage only or are uninsured.

Appendix 2. Sample sizes and datasets used in analysis

	Previously insured in individual market				Previously uninsured				
	CPS, California	CPS, Federal HIX	MEPS (non-group insured used for post-ACA OOP)	CPS, California	CPS, California	CPS, Federal HIX	CPS, Federal HIX	MEPS, CA and Federal HIX (non-group and group insured used for post-ACA OOP)	MEPS, CA and Federal HIX (non-group and group insured used for post-ACA OOP)
Used in table	1A	2A	1A,2A	3A	3B	4A	4B	3A,4A	3B,4B
Years	2011, 2012	2011, 2012	2005-2011	2011, 2012	2011, 2012	2011, 2012	2011, 2012	2010-2011	2010-2011
Income level (% FPL)	> 138	> 138	> 138	138 to 300	> 300	138 to 300	> 300	138 to 300	> 300
Men									
25 to 44	92	384	86	358	134	1,915	868	1,399	2,721
45 to 54	45	294	22	146	64	718	422	674	1,678
55 to 64	41	311	45	76	51	399	324	440	1,574
All men	178	989	153	580	249	3,032	1,614	2,513	5,973
Women									
25 to 44	70	245	64	206	76	1,316	439	1,739	2,635
45 to 54	52	219	54	93	37	501	249	779	1,852
55 to 64	62	413	77	64	31	322	198	562	1,538
All women	184	877	195	363	144	2,139	886	3,080	6,025
TOTAL	362	1,866	348	943	393	5,171	2,500	5,593	11,998