

REGULATION BY CALCULATOR: EXPERIENCE UNDER THE AFFORDABLE CARE ACT

*Seth J. Chandler**

2016 MICH. ST. L. REV. 465

TABLE OF CONTENTS

INTRODUCTION.....	465
I. THEORY OF REGULATION BY CALCULATOR.....	469
II. THE PROCESS OF CREATING THE ACTUARIAL VALUE CALCULATOR.....	475
III. USING THE ACTUARIAL VALUE CALCULATOR TO ASSESS TRANSITIONAL REINSURANCE	488
A. The Evolution of Claims in the Early Years of the Affordable Care Act.....	489
B. A Closer Look at Transitional Reinsurance Premiums	495
CONCLUSION.....	508

INTRODUCTION

As even many of its supporters would agree, the Affordable Care Act (ACA),¹ the piece of legislation that transforms healthcare finance in the United States, is an extraordinarily complex law.² The

* Foundation Professor of Law, University of Houston Law Center. A.B., Princeton University, 1979; J.D., Harvard Law School, 1983.

1. What people generally call the Affordable Care Act (ACA) is actually two laws, the Patient Protection and Affordable Care Act, Pub. L. No. 111-148, 124 Stat. 119 (2010), and the Health Care and Education Reconciliation Act of 2010, Pub. L. No. 111-152, 124 Stat. 1029 (2010) enacted shortly thereafter.

2. See, e.g., Alexander Bolton, *ObamaCare Author: Health Law Is 'Really Complicated,'* THE HILL (Dec. 3, 2014, 6:00 AM), <http://thehill.com/homenews/senate/225812-harkin-dems-better-off-without-obamacare> [<https://perma.cc/A2YE-6ZRK>] (quoting leading proponent of law as stating, “What we did is we muddled through and we got a system that is complex, convoluted, needs probably some corrections and still rewards the insurance companies extensively”); Alice M. Rivlin, *Implementing the Affordable Care Act: Why Is This So Complex?,* BROOKINGS INSTITUTION (July 8, 2013, 10:26 AM), <http://www.brookings.edu/blogs/up-front/posts/2013/07/08-affordable-care-act-implement-health-rivlin> [<https://perma.cc/PK77-ZD5L>] (arguing that “[t]he complexity is created by our two

ACA is like many examples of high-numbered versions of software first written years ago. It attempts to maintain a good degree of backwards compatibility with existing health insurance regulations while seeking to add numerous new features and, at times, undo architectures such as medical underwriting now judged to be a mistake. In the software industry,³ and as the ACA demonstrates in law, such efforts generally result in far more complex products than might exist were one able to design from scratch.

One idea behind the ACA is that insurers should retain some freedom to evolve health insurance products that the marketplace suggests would best meet the needs of consumers.⁴ Another idea, however, is that consumers should be able to make at least somewhat informed choices among these evolving products.⁵ They should do so based on their own needs and preferences for financial risk and for choice in the selection of medical professionals.

These twin ideas of freedom and choice rest in practical tension. This opposition occurs because the insurance product has at least three separate problems that create unavoidable complications in the drafting of coverages, conditions, and exclusions: (1) moral hazard—the proclivity of insurance to increase the frequency of insured events; (2) adverse selection—the tendency of people who believe, usually accurately, they have disproportionately high risk to purchase insurance; and (3) correlated risk—the hazards posed to an insurer when insured events are not “statistically independent” health insurance products.⁶ True comprehension of almost all forms of privately developed insurance may take years of education.

American health insurance has traditionally reduced this tension through use of intermediaries. Most consumers, be they

traditions of relying on private markets whenever possible and preserving diversity at the state level”).

3. See BARRY BLUNDELL ET AL., *COMPUTER SYSTEMS AND NETWORKS* 196 (Walaah Bakry ed., 2007).

4. See SABRINA CORLETTE, JOANN VOLK, ROBERT BERENSON & JUDY FEDER, *THE CENTER ON HEALTH INSURANCE REFORMS, NARROW PROVIDER NETWORKS IN NEW HEALTH PLANS: BALANCING AFFORDABILITY WITH ACCESS TO QUALITY CARE* 5-8 (2014), <http://www.urban.org/sites/default/files/alfresco/publication-pdfs/413135-Narrow-Provider-Networks-in-New-Health-Plans.PDF> [<https://perma.cc/P8W7-BP8W>] (discussing generally tradeoffs between freedom of insurers to sculpt networks and consumer protection).

5. See Katherine T. Vukadin, *Obamacare Interrupted: Obstructive Federalism and the Consumer Information Blockade*, 63 *BUFF. L. REV.* 421, 423-28 (2015).

6. For an excellent summary, see Ronen Avraham, *The Economics of Insurance Law—A Primer*, 19 *CONN. INS. L.J.* 29 (2012).

individuals or employers, do not just go out and purchase health insurance on their own. Nor, despite the excitement it might generate for some, do they go out and obtain a degree or certificate in risk management. Instead, they place their trust in human intermediaries, usually based on reputation and faith in their regulation. To be sure, on occasion, as with so-called Medigap policies that supplement the insurance provided by Medicare Parts B or C,⁷ government has attempted to reduce the complexity of health insurance products by constraining insurer freedom in favor of consumer comprehension. The decision to allow only a small set of policy forms drawn from a tiny subset of coverage possibilities has, however, been more the exception than the rule in health insurance.⁸

Thus, as the ACA was being drafted and implemented, the question remained as to whether product complexity and consumer choice could be reconciled in any other way. This Article is about the method Congress suggested and the Obama administration implemented to engage with both these goals. In short, the Obama administration has tried to preserve both complexity and meaningful choice by using a spreadsheet⁹ to regulate insurance. The spreadsheet goes by the name of the Actuarial Value Calculator.¹⁰

7. 42 U.S.C. § 1395ss (2012).

8. See Daniel Schwarcz, *Transparently Opaque: Understanding the Lack of Transparency in Insurance Consumer Protection*, 61 UCLA L. REV. 394, 433-36 (2014) (discussing the problem in general and with specific discussion of Medigap); Amanda Starc, *Insurer Pricing and Consumer Welfare: Evidence from Medigap*, 45 RAND J. ECON. 198 (2014) (discussing welfare effects of standardization); see also Abraham L. Wickelgren, *Standardization as a Solution to the Reading Costs of Form Contracts*, 167 J. INSTITUTIONAL & THEORETICAL ECON. 30, 38-40 (2011).

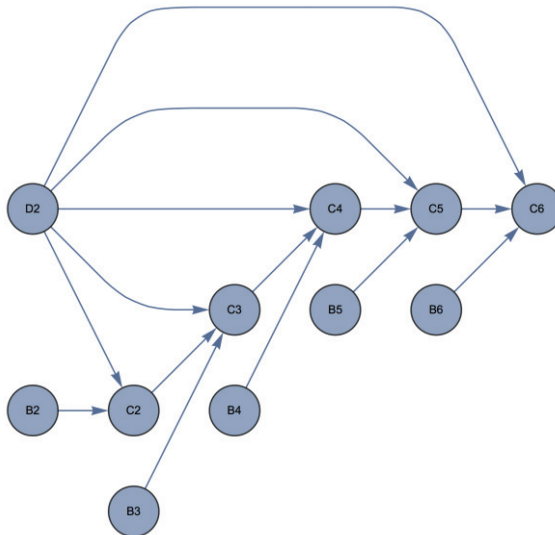
9. A spreadsheet may be thought of as a directed graph of computations in which the values and bits of programming at each node in the graph are depicted in a two dimensional—or in the case of modern “tabbed spreadsheets” like Microsoft’s Excel, three dimensional—array. Changing a value or formula in a spreadsheet triggers the cascade of computations dictated by the graph structure. Here, for example, is the typical presentation of a simple spreadsheet, one that computes the end-of-year balance of a bank account given constant interest rates and variable contributions at the start of each year.

	A	B	C	D
1	Year	Contribution	Balance	Interest Rate
2	1	3	3.18	0.06
3	2	2	5.4908	
4	3	4	10.060248	
5	4	-1	9.60386288	
6	5	-7	2.76009465	
7				

This Article is about three somewhat distinct lessons that can be gleaned from regulation by calculator. The first lesson is one of theory. Regulation by calculator might, in fact, be a good thing. It permits government to construct regulations with complexity levels matching the needs of the field, while also permitting private parties without insider access to have at least some understanding of the relationship between their own conduct and the regulatory consequences. Permitting sales of complex products may often be a good thing, but it is considerably more of a good thing if the government can present a simplified version to consumers that actually captures the essential features of the product being regulated.

The second lesson is one of process. If we are going to rely on regulation by calculator, we need to construct the Actuarial Value Calculator with great care. As courts have sometimes realized when looking at formulae, the algorithm, be it one that can be implemented by hand and understood through traditional mathematical notation, or be it one that can only be understood as an elaborate computation

And here is the directed graph of computations going on behind the scenes. A change in cell C3 triggers recomputation of the successor cells C4, C5, and C8.



10. DEP'T OF HEALTH & HUMAN SERVS., PATIENT PROTECTION AND AFFORDABLE CARE ACT; ACTUARIAL VALUE CALCULATOR METHODOLOGY (n.d.), <https://www.cms.gov/CCIIO/Resources/Files/Downloads/av-calculator-methodology.pdf> [<https://perma.cc/QCE5-YJXW>].

written in some computer language,¹¹ essentially becomes the law.¹² It should be constructed in an open and careful process with meaningful opportunities for feedback to correct inevitable shortcomings.¹³ As will be discussed here, the Actuarial Value Calculator does poorly on this score.

A third lesson is about a likely collateral benefit of regulation by calculator: the liberation of data that can be used for multiple and sometimes unintended purposes. In particular, in the most explicitly computational part of this Article, I show how the unique healthcare claims expense data contained within the Actuarial Value Calculator can actually be used to shed light on a problem of great practical importance and controversy: whether the significant gross premium increases experienced on many healthcare Exchanges over the past three years are simply the transitory consequence of the phase out of an ACA component known as Transitional Reinsurance. If not, these significant increases are more likely to portend a more fundamental problem with the ACA's established system of insurance. I conclude that the phase out of Transitional Reinsurance has been a factor in gross premium increases but, troublingly, is unlikely to be responsible for much of the experienced increase.

I. THEORY OF REGULATION BY CALCULATOR

The modern regulatory state runs on computation. Be it the computation of personal income taxes,¹⁴ the requirements of

11. Many computations are better expressed in a computer language rather than using traditional mathematical notation and equations. See STEPHEN WOLFRAM, *A NEW KIND OF SCIENCE* 368 (2002); see also Stephen Wolfram, *Mathematical Notation: Past and Future* (2000), STEPHEN WOLFRAM, <http://www.stephenwolfram.com/publications/mathematical-notation-past-future> [<https://perma.cc/9NGC-ANEM>] (last visited Apr. 12, 2016) (describing history of traditional mathematical notation and its limitations).

12. See *State Bd. of Equalization v. Sierra Pac. Power Co.*, 634 P.2d 461, 463 (Nev. 1981); cf. *Allina Health Servs. v. Sebelius*, 746 F.3d 1102, 1106-07, 1109-11 (D.C. Cir. 2014) (holding that a change in how to count Medicare Part C beneficiaries for purposes of computing Medicare reimbursements constituted a regulation triggering the Administrative Procedure Act).

13. See FRANK PASQUALE, *THE BLACK BOX SOCIETY: THE SECRET ALGORITHMS THAT CONTROL MONEY AND INFORMATION* (2015) (discussing the dangers of secret algorithms).

14. One can view 26 U.S.C. § 1 (2012) as the top level routine in a massive computer program called the Internal Revenue Code that includes what might be termed "subroutines" for matters such as the definition of taxable income, 26 U.S.C.

environmental statutes,¹⁵ reimbursements under the Medicare and Medicaid statutes,¹⁶ the required capitalization of bank holding companies,¹⁷ the limitations on pre-funding of various life insurance policies,¹⁸ or child support obligations,¹⁹ our regulations must often address a bewildering variety of financial or physical situations and collapse them down to a single number or small set of numbers. We map from our enormous diversity in financial and personal situations down to an amount of tax owed; the outputs of our factory and local atmospheric chemistry down to emission limitations; the panoply of possible medical conditions and procedures down to a reimbursement number; the infinite portfolios of banks and related companies down to a measure of the amount that must be held in various assets; the varying obligations and benefits under a universal life insurance policy down to a limitation on the amount that may be

§ 63, and what might be termed exception handling for matters such as the alternative minimum tax.

15. See *Greenhouse Gas Equivalencies Calculator*, U.S. ENVTL. PROTECTION AGENCY, <http://www.epa.gov/energy/greenhouse-gas-equivalencies-calculator> [<https://perma.cc/45AZ-H3PG>] (last visited Apr. 12, 2016) (providing a web-based form with computation performed on the server side that lets individuals know the effect of various activities on greenhouse gas emissions); *National Stormwater Calculator*, U.S. ENVTL. PROTECTION AGENCY, <http://www.epa.gov/water-research/national-stormwater-calculator> [<https://perma.cc/GQL9-XY98>] (last visited Apr. 12, 2016) (providing a Windows-based program that estimates the annual amount of rainwater and frequency of runoff from a specific site anywhere in the United States).

16. 42 U.S.C. § 1395w-4 (2012).

17. See 12 C.F.R. §§ 217.1-.300 (2015). Recently, the government has begun distributing its Bank Estimation Tool, *Regulatory Capital Estimation Tool for Community Banks*, FDIC, https://www.fdic.gov/regulations/capital/Bank_Estimation_Tool.xlsm [<https://perma.cc/7KWK-42PZ>] (last updated Nov. 17, 2014), an elaborate, tabbed Excel spreadsheet somewhat akin to the Actuarial Value Calculator, to help banks perform the computations needed to determine whether they are adequately capitalized. However, the tool itself warns as part of its “splash screen,” and in cell A36 of its first tab, that “[n]either this estimation tool nor the results derived therefrom may be used for any business or regulatory purpose, including regulatory reporting or compliance purposes.” *Id.* It is thus not quite as radical a use of spreadsheets as the Actuarial Value Calculator, which essentially does have official status.

18. 26 U.S.C. §§ 7702A, 7702B (2012).

19. See *California Child Support Self Service - Number of Dependents*, CA. DEPT. OF CHILD SUPPORT SERVS., <https://www.cse.ca.gov/ChildSupport/cse/guidelineCalculator#> [<https://perma.cc/4WWL-KEY9>] (last visited Apr. 12, 2016) (providing a web-based form with computation performed on the server side that computes the child support obligation).

contributed each year before losing tax preferred status; and from the family, health, and financial situation of a parent down to an amount owed on behalf of one's child.

All of these are examples of computations that balance various regulatory ideas. They likely could be performed using spreadsheets and, in some limited cases, are implemented that way. They are implemented either through government creation or, in some instances, private industry attempting to emulate the regulatory structure.

The mapping down to a small set of values is sometimes essential because, notwithstanding the complexity of the world, government ultimately demands some well-defined obligation: pay a certain amount of tax, pay a certain amount of child support, get a certain reimbursement from Medicare. While the concept of "pay something or get something that is kind of fair" may work satisfactorily in some contexts as a regulatory regime, it can breed an awful lot of uncertainty and litigation in many others. We often want a single, precise number.

In other instances, however, the computation specified in a statute or regulation or simply in a calculator or web form provided by the government may exist predominantly for the purpose of communication. Thus, although there is, insofar as my research can discover, no restriction on the total carbohydrate content of foods sold in the United States, there are nonetheless required complex computations that food sellers must make about total carbohydrate content that then must appear in a standardized form on nutrition labels.²⁰ Ordinary consumers can inspect the labels before determining whether the food is worth purchasing without acquiring calorimeters, a chemical testing laboratory, and various treatises on the necessary computations. The Insurance Regulatory Information System (IRIS) score, which the National Association of Insurance Commissioners²¹ developed and incorporated into various state insurance regulation statutes,²² is another example, although in this instance the information consumer is the government itself.

20. See 21 C.F.R. § 101.9(c)(6) (2015) (incorporating by reference the computations contained in ANNABEL L. MERRILL & BERNICE K. WATT, ENERGY VALUE OF FOODS . . . BASIS AND DERIVATION, USDA AGRIC. HANDBOOK No. 74, at 2, 3 (slightly rev. ed. 1973)).

21. William Campbell Ries, *Financial Statement Analysis—IRIS*, in 1 REGULATION OF INVESTMENT MANAGEMENT AND FIDUCIARY SERVICES § 7:17 (2014).

22. See, e.g., IDAHO ADMIN. CODE r. § 18.01.66.001.02 (2016); ARIZ. ADMIN. CODE § R20-6-308(A)(2) (2012).

Basically, IRIS is a vehicle for collapsing a large volume of information about the financial condition of an insurer into a small set of numbers. There is no absolute requirement that any insurance regulator place an insurer into receivership or conservatorship, or otherwise impose a sanction if the IRIS scores depart from various norms; however, it is valuable information that regulators should and often must consider in determining how and whether to supervise a licensed insurer.²³ Calculators can also serve as instruments of self-examination in considering reduction of greenhouse gases through recycling.²⁴

And of course, in still further instances, computation serves two purposes: to constrain and to communicate simplified information. Refrigerators are an example with which many may have had experience. Although the actual energy consumed by a refrigerator might depend on a variety of factors—ambient air temperature, frequency of snacking, amount and type of food and beverages stored—the average consumer does not have to acquire test equipment or perform thermodynamic computations in order to assess its efficiency. The federal government directs refrigerator manufacturers to test their equipment and label the machines' energy efficiency,²⁵ and, indeed, it prohibits the sale if the energy efficiency exceeds some standard.²⁶

The Actuarial Value Calculator falls into this latter category of use of calculations: it both communicates and constrains. Its main purpose is to reduce the complexity of health insurance coverage and cost sharing provisions down to a single number: the actuarial value. But by outlawing policies whose actuarial values are less than 58% or between 62% and 68%, between 72% and 78%, between 82% and

23. See NATIONAL ASSOCIATION OF INSURANCE COMMISSIONERS, INSURANCE REGULATORY INFORMATION SYSTEM (IRIS) RATIOS MANUAL 1 (2015), http://www.naic.org/documents/prod_serv_fin_receivership_uir_zb.pdf [<https://perma.cc/US64-SS3Y>].

24. *Recycled Content (ReCon) Tool*, U.S. ENVTL. PROTECTION AGENCY, http://www3.epa.gov/warm/ReCon_home.html [<https://perma.cc/4KMC-J9LT>] (last visited Apr. 12, 2016).

25. See 16 C.F.R. § 305.11 (2015) (providing a multi-page description of the label that must appear on a refrigerator).

26. 42 U.S.C. § 6295(b)(1) (2012). Automobile safety ratings are another example in which the government spares individuals the need to acquire crash dummies or perform mechanical engineering computations before purchasing a product. The federal government requires that cars be labeled in a standardized way and prohibits sale of cars failing the test. See 49 C.F.R. § 575.301 (2015).

88%,²⁷ they also implicitly constrain the types of coverages and cost sharing arrangements that insurers selling policies on the healthcare Exchanges may use.

Another virtue of regulation using calculators distributed to the public is that they eliminate the need for the many shadow calculators that individuals create at considerable expense, precisely when government has a complex algorithm but does not share it with the public. The popular program TurboTax (and similar products) exists as an emulator of the tax code and of the computations the Internal Revenue Service must perform internally precisely to fill this lacuna. Their development has led these entities with large sunk costs to somewhat understandably oppose development of public, official tax calculators like those that exist in countries such as Denmark, Sweden, and Spain.²⁸ Privately created shadow calculators abound in fields ranging from Medicare reimbursement²⁹ to subsidies and from cost sharing under the ACA³⁰ to the compliance of various rooftop heating and air conditioning units with regulatory requirements.³¹

The Actuarial Value Calculators under study here are somewhat unusual,³² however, in that they essentially constitute the

27. As with almost everything one can say about the ACA, one needs a footnote here. Although the permitted “de minimis” variation around the target actuarial values is usually plus or minus 2%, see 45 C.F.R. § 156.140(c) (2015), this liberality is not always the case. See 45 C.F.R. § 156.400 (defining a 1% plus or minus de minimis variation for “silver plan variation[s]”). Moreover, other Actuarial Values are permitted for “cost sharing reduction” policies pursuant to 42 U.S.C. § 18071(c)(1)(B) (2012). And a 72% conventional Silver plan may not be sold if the insurer is also selling a 73% cost sharing reduction Silver plan. 45 C.F.R. § 156.420(f).

28. See Liz Day, *How the Maker of TurboTax Fought Free, Simple Tax Filing*, PROPUBLICA (Apr. 14, 2014), <http://www.propublica.org/article/how-the-maker-of-turbotax-fought-free-simple-tax-filing> [<https://perma.cc/U4YW-U5BN>].

29. See Chip Hart, *Free 2016 RVU Calculator*, CONFESSIONS OF A PEDIATRIC PRAC. MGMT. CONSULTANT, <http://chipsblog.pcc.com/free-2016-rvu-calculator/> [<https://perma.cc/ML7N-KKAJ>] (last visited Apr. 12, 2016) (providing a system that attempts to emulate the reimbursements Medicare gives to providers using the “RBRVS” algorithm).

30. *Health Insurance Marketplace Calculator*, HENRY J. KAISER FAM. FOUND., <http://kff.org/interactive/subsidy-calculator/> [<https://perma.cc/5XFN-J6KH>] (last visited Apr. 12, 2016).

31. *Rooftop Unit Comparison Calculator (RTUCC)*, PAC. N.W. NAT’L LABORATORY, <http://www.pnnl.gov/uac/> [<https://perma.cc/5N8W-4HLD>] (last visited Apr. 12, 2016).

32. The one parallel example I could find in my research appears to be the “179D Calculator” created by the United States Department of Energy to determine

regulation. Moreover, rather than keep the Calculator behind some firewall as is the case for computing personal income taxes, here it is distributed for all to see and play with. By distributing the Calculator to the public, the government permits sophisticated entities to optimize their conduct so that they only barely comply with the regulation. This distribution, though possibly equalizing regulatory burdens, can also weaken the strength of regulation.

The peculiarity of public distribution can be seen by considering an insurer wishing to sell a “Gold” insurance product on the Exchanges. The insurer knows that it will be acceptable if it provides anywhere from 78% to 82% actuarial value. Without the benefit of the Calculator, the insurer might have some uncertainty as to whether its product would comply and, to prevent the costs associated with reformulation, might create a safety margin and provide a Gold product that provided, for example, 81% actuarial value. With a distributed Calculator, a little patience, a sizeable staff, and a modest understanding of Excel, an insurer can tweak various parameters until it just satisfies the requirement, likely finding a 78% actuarial value. An insurer has an incentive to do so because the consumer is extremely unlikely to be able to distinguish between a 78% and 82% Gold product. The consumer just knows it says “Gold” on it. So the cost of complete transparency is the ability of private entities to strategically exploit regulation to the maximum.³³ Some dare call it “gaming.”

whether various buildings are eligible to obtain a tax deduction for energy efficiency. *179D DOE Calculator*, U.S. DEP’T OF ENERGY, <http://apps1.eere.energy.gov/buildings/commercial/179d/> [<https://perma.cc/6DAU-ZG2D>] (last visited Apr. 12, 2016). The computation is performed server side using a web-based client but, so far as I can determine, the result of the computation appears definitive on the issue of whether eligibility exists. I suspect, however, that a more thorough exploration of the large universe of federal and state regulations would find many other scenarios in which the results of “tweakable computations” were definitive as to whether a regulatory requirement was met.

33. The failure to provide an application programming interface (API), *see infra* note 63, somewhat limits the ability of insurers to optimize perfectly. Another example of distributed computation trading potentially problematic strategic behavior in favor of transparency is the “cost sharing calculator” recently provided by Centers for Medicaid and Medicare Services (CMS) to those purchasing policies on HealthCare.gov. *Your Total Costs for Health Care: Premium, Deductible & Out-of-Pocket Costs*, HEALTHCARE.GOV, <https://www.healthcare.gov/choose-a-plan/your-total-costs/> [<https://perma.cc/8Q6F-9EFK>] (last visited Apr. 12, 2016). The prospective purchaser is now asked to state whether they anticipate being a low, medium, or high user of medical services. *Id.* Instead of just producing a premium as in previous versions of HealthCare.gov, the server provides the user with an

II. THE PROCESS OF CREATING THE ACTUARIAL VALUE CALCULATOR

In its implementation of the Affordable Care Act through 2016, the Obama administration neither inserted a large role for human insurance intermediaries nor narrowed the set of permissible benefits and cost sharing parameters at the federal level in a way that would make it simplest for consumers in all states to compare Qualified Health Plans sold on the Exchanges.³⁴ It instead permitted insurers to compete much as they had before³⁵ with sales directly to

estimated total cost: net premium and expected cost sharing. *Id.* This computation will lead high-cost consumers to favor Gold and Platinum policies more often, while leading low-cost consumers to favor Bronze and Silver policies more often. The transparency provided by this computation increases the asymmetry of information between an insurer and the insured thus exacerbates adverse selection. See Peter Siegelman, *Adverse Selection in Insurance Markets: An Exaggerated Threat*, 113 YALE L.J. 1223, 1247, 1251, 1279 (2004) (noting that adverse selection depends on insureds being able to out-predict insurers).

34. Under § 1301(a)(1)(C) of the ACA, an insurer cannot sell a policy on an exchange unless it has been licensed by the relevant state. 42 U.S.C. § 18021 (2012). Using licensing authority not preempted by the ACA, states have therefore been permitted, however, to constrain the diversity of individual insurance policies beyond that permitted by federal regulation. About eight states, including California, Connecticut, D.C., Delaware, Massachusetts, New York, Oregon, and Vermont, in fact, currently have mandatory standardization. Caroline F. Pearson & Elizabeth Carpenter, *Proposed Exchange Standardized Benefit Designs Expand First-Dollar Coverage for Services and Drugs*, AVALERE HEALTH (Jan. 14, 2016), <http://avalere.com/expertise/life-sciences/insights/proposed-exchange-standardized-benefit-designs-expand-first-dollar-coverage> [https://perma.cc/MZB9-XK6B]. Somewhat surprisingly, states in which government officials purport to have great hostility to the ACA have not aggressively used their licensing authority to prevent insurers from selling policies on the Exchanges. This may change, however, if insurers continue to lose large sums of money selling policies. See John Murawski, *Blue Cross Projects \$400M Loss in NC on ACA in Just 2 Years*, NEWS & OBSERVER (Jan. 29, 2016, 6:17 PM), <http://www.newsobserver.com/news/business/article57367343.html> [https://perma.cc/L5PW-GV39]. Many states, however, have forced insurers to raise premiums above what was requested. See Dan Mangan, *Oregon Dumps Cold Water on Low Obamacare Rates*, CNBC (June 22, 2015, 3:49 PM), <http://www.cnbc.com/2015/06/22/oregon-dumps-cold-water-on-low-obamacare-rates.html> [https://perma.cc/QUEU-4E84]; Charles Gaba, *Florida: IRONY ALERT!! *Approved* 2016 Rate Hikes HIGHER than Requested . . . but Lower than I Estimated!*, ACASIGNUPS.NET (Aug. 27, 2015, 2:19 PM), <http://acassignups.net/15/08/27/florida-irony-alert-approved-2016-rate-hikes-higher-requestedbut-lower-i-estimated> [https://perma.cc/K7BL-7C27].

35. As this Article went to press, the law on this subject changed. In a letter to insurance issuers dated February 29, 2016, 2017 LETTER TO ISSUERS IN THE FEDERALLY-FACILITATED MARKETPLACES, CTRS. FOR CONSUMER INFO. & INS. OVERSIGHT (Feb. 29, 2016), <https://www.cms.gov/CCIIO/Resources/Regulations->

consumers.³⁶ Insurers selling Qualified Health Plans in most states can select from roughly the same broad span of benefit- and cost-sharing choices those insurers had collectively deployed in the commercial market prior to enactment of the ACA.³⁷ Insurers can still choose plan features, such as emergency room deductibles, copays on prescription medications, use of coinsurance versus use of copays, and “leveling” of providers into various reimbursement categories. They can also select those cost sharing expenses that will reduce the insured’s applicable deductible and those that will not.³⁸

and-Guidance/Downloads/Final-2017-Letter-to-Issuers-2-29-16.pdf [<https://perma.cc/SP6U-XN8B>], and in modifications to 45 C.F.R. § 155.205 (2015), the Center for Medicare and Medicaid Services announced that starting in 2017, six “standardized options” (one Bronze, four Silver, and one Gold) would be brewed up by CMS that would have preset cost sharing and benefit constraints. These constraints will apparently be uniform throughout the United States even though the value of various cost sharing options may vary significantly. Plans that failed to fall within these constraints—“standardized options”—would be given a deprecated position on HealthCare.gov. Patient Protection and the Affordable Care Act; HHS Notice of Benefit and Payment Parameters for 2017, 80 Fed. Reg. 75,488 (Dec. 2, 2015), <https://www.federalregister.gov/articles/2015/12/02/2015-29884/patient-protection-and-affordable-care-act-hhs-notice-of-benefit-and-payment-parameters-for-2017#p-568> [<https://perma.cc/2Y9Z-MM3Z>]. Issuers would also continue to be prevented from selling plans that were similar to one of the preset plans but were not “meaningfully different.” 45 C.F.R. § 156.298. It is unclear the extent to which these “standardized plans” would thus preempt alternatives that might be somewhat similar. The leading industry lobbying group, America’s Health Insurance Plans (AHIP), opposes the proposal on grounds that it would restrict consumer choice and places too much emphasis on government-chosen standardization. Presumably state regulatory authorities would need to approve these standardized options before they could be sold.

36. To be sure, § 1311(i) of the ACA establishes insurance “Navigators,” but these individuals serve mostly as intermediaries or general educators in the signup process—how to navigate HealthCare.gov or state-based websites. 42 U.S.C. § 18031(i) (2012). It is not generally their job to enlighten consumers on the advantages or disadvantages of particular insurance plans in the way that a traditional broker or agent might.

37. See 42 U.S.C. § 18032(d)(1).

38. An insurer may decide to offer a plan in which the “copay”—the specific amount an insured pays a provider for a service—does not count towards the deductible. One might have a \$2,000 deductible before incurring a \$50 copay for a doctors visit and still have a \$2,000 deductible after the \$50 copay is made. The payment of the \$50 would, however, reduce the amount that the insured could still be held liable for as a result of the “maximum out of pocket limit.” Thus, if an insured could still be held liable for \$6,000 before payment of the \$50, by virtue of making the \$50 payment, the most they would thereafter have to pay in cost sharing would be reduced to \$5,950. Few consumers have an understanding of these complexities. LYNN QUINCY, THE COMMONWEALTH FUND, MAKING HEALTH INSURANCE COST-SHARING CLEAR TO CONSUMERS: CHALLENGES IN IMPLEMENTING

As noted by Consumers Union³⁹ in a study cited by the Centers for Medicare and Medicaid Services in its February 2012 preliminary unveiling of the Actuarial Value Calculator,⁴⁰ this almost infinite flexibility in the selection of plan parameters makes it very challenging for consumers intelligently to compare plans. Consumers have challenges, for example, assessing the comparative merits of (1) Plan A that had low coinsurance for imaging (X-Rays, MRIs) but a high emergency room copay that did not apply towards the deductible; and (2) Plan B that had higher imaging coinsurance requirements but also used leveling with respect to certain medical services. Under Plan B, use of some emergency rooms might require high copays that did not apply to the deductible, while use of others might require low emergency room copays that did.

The ACA contemplated, however, that consumer plan comparison would instead be facilitated by a computation the federal government would make.⁴¹ The ACA would ultimately collapse this infinite variety of benefits and cost sharing parameters into a single number: “actuarial value.” In some sense, the contract would be simplified on marketing websites such as HealthCare.gov to three characteristics: a gross premium, one of four methods of choosing providers (Health Maintenance Organization, Extended Provider

HEALTH REFORM’S INSURANCE DISCLOSURE REQUIREMENTS (Feb. 2011), http://www.commonwealthfund.org/~media/Files/Publications/Issue%20Brief/2011/Feb/1480_Quincy_making_hlt_ins_costsharing_clear_consumers_ib.pdf [https://perma.cc/D3TZ-8A67]; George Loewenstein et al., *Consumers’ Misunderstanding of Health Insurance*, 32 J. HEALTH ECON. 850 (2013), <http://www.hks.harvard.edu/fs/bmadria/Documents/Madrian%20Papers/Consumers%20Misunderstanding%20of%20Health%20Insurance.pdf> [https://perma.cc/P46Q-UADH].

39. CONSUMERS UNION, CREATING A USABLE MEASURE OF ACTUARIAL VALUE (Jan. 2012), http://consumersunion.org/pub/pdf/CU_Actuarial_Value_2012_Report.pdf [https://perma.cc/BR6M-KZZF].

40. CTRS. FOR MEDICARE & MEDICAID SERVS., ACTUARIAL VALUE AND COST-SHARING REDUCTIONS BULLETIN (2012), <https://www.cms.gov/CCIIO/Resources/Files/Downloads/Av-csr-bulletin.pdf> [https://perma.cc/5DZ2-6J4P].

41. In theory, since 2015 a state can develop its own metric to compute the actuarial value of a plan sold in that state. 45 C.F.R. § 156.135(d). To do so, the state could and likely would then use claims data for its own state. And apparently, early dissatisfaction with the calculators led at least some states to consider developing their own methodology. In part perhaps because of the regulatory hurdles that need to be overcome for a state to use its own methodology, see CTRS. FOR MEDICARE & MEDICAID SERVS., STATE TECHNICAL ASSISTANCE ON STATE-SPECIFIC DATA FOR THE ACTUARIAL VALUE CALCULATOR (Aug. 15, 2014), <https://www.cms.gov/CCIIO/Resources/Regulations-and-Guidance/Downloads/final-state-avc-guidance.pdf> [https://perma.cc/8BTC-BHU5], I am not aware of any state that is using anything other than the federal Actuarial Value Calculator.

Organization, Point of Service, and Preferred Provider), and one of four “Metal Levels.” This latter dimension—the Metal Level—itself was a direct mapping from one of four percentage values—actuarial value—most consumers could use.⁴² More sophisticated insureds could supplement this actuarial value figure with a fine-grained examination of the particular cost sharing and benefit parameters. The compression of a tremendous amount of complexity into a single number is perhaps somewhat analogous to the way U.S. News & World Report collapses the variety of widely varying characteristics of educational institutions into a single ranking number,⁴³ or the way various sports-oriented video games collapse the diverse variety of skills held by a player into a single rating.⁴⁴

Not only does the ACA provide an actuarial value to qualified health plans, but the ACA also makes only certain ratings acceptable. The ACA constrains insurers to offer only plans whose “actuarial value” takes on one of a small set of discrete values.⁴⁵ Each of these actuarial values corresponds with a supposedly evocative “metal level” label going from Bronze (the least generous) through Silver,⁴⁶ Gold, and Platinum (the most generous).⁴⁷

42. Proponents of the ACA have praised the use of a single number: Louise Norris, an author for the pro-Obamacare website healthinsurance.org, writes, for example,

Incidentally, the beauty of the AV regulation is that it makes plans very easy to compare to one another. Instead of wading through a vast range of plans that differ in myriad ways, consumers can concentrate on factors like networks, price, and quality ratings, knowing that the underlying coverage of all the plans in the same metal level is very similar.

Louise Norris, *Why Your ACA Health Plan Wasn't Cancelled*, HEALTHINSURANCE.ORG (Sept. 26, 2014), <https://www.healthinsurance.org/blog/2014/09/26/why-your-aca-health-plan-wasnt-cancelled/> [<https://perma.cc/S3P6-6XTG>].

43. See *Education Rankings & Advice*, U.S. NEWS, <http://www.usnews.com/education> [<https://perma.cc/4KG7-KKSW>] (last visited Apr. 12, 2016).

44. *FIFA 15 Player Ratings - Top 50*, EA SPORTS (Sept. 7, 2014, 9:00 AM), <https://www.easports.com/fifa/news/2014/fifa-15-player-ratings-top-50> [<https://perma.cc/R2MC-WHV6>].

45. In part because it might be nearly impossible for a plan to offer *exactly* 80% actuarial value, for example, ACA regulations permit a “de minimis” exception. Usually, so long as the computed actuarial value lies within plus or minus 2% of the statutory figure, the plan is acceptable. 45 C.F.R. § 156.140(c). For certain Silver plans, however, there is less flexibility: Insurers must create a plan whose actuarial value lies within plus or minus 1% of the statutory figure. 45 C.F.R. § 156.400 (defining the “de minimis variation for a silver plan variation” (emphasis omitted)).

46. The actuarial value of a Silver policy is somewhat confusing. By default, the actuarial value is 70%. In practice, however, most Silver policies have a higher actuarial value when viewed from the perspective of the insured. This

In regulations promulgated by the Centers for Medicare & Medicaid Services (CMS) during the first few years the ACA was in effect, the Obama administration defined the “actuarial value” of a plan as the ratio between (1) the amount the insurer will, on average, for some hypothetical “standard population”⁴⁸ in some hypothetical area of the country,⁴⁹ pay in claims on “essential health benefits” provided by that plan relative to (2) the amount that the insurer and the insured together will on average pay on such claims.⁵⁰ Thus, if on average the insurer would pay \$4,000 in claims on essential health benefits on some plan if purchased by a hypothetical population and an insured drawn from that population would on average pay \$1,000, then the “actuarial value” of that plan would be 80% and be labeled

increase occurs because of a program called “cost-sharing reductions” contained in § 1402 of the ACA. 42 U.S.C. § 18071 (2012). This provision requires insurers to provide policies that are labeled “Silver” but that provide 73%, 87%, and 94% actuarial value depending inversely on the income of the insured. *Id.* The Obama administration believes Congress appropriated funds to pay insurers the additional costs of providing these subsidized policies and has in fact been making those payments. Complaint, U.S. House of Representatives v. Burwell, No. 14-cv-01967, 2015 WL 5294762 (D.D.C. Sept. 9, 2015), <http://www.speaker.gov/sites/speaker.house.gov/files/HouseLitigation.pdf> [<https://perma.cc/AH3H-XYWZ>]. The House of Representatives has sued the Secretary of the Treasury for making those payments, saying it never authorized subsidies from the federal government to large insurance corporations. *See id.* at 3.

47. 42 U.S.C. § 18022(d).

48. *See* 42 U.S.C. § 18022(d)(2)(A); 45 C.F.R. § 156.135(c)-(f). The problem with using a uniform “standard population” to compute actuarial value is that, for a variety of reasons, including the geographic variation in health costs throughout the United States, many plans do not confront standard populations. Thus, in theory, the percentage of costs a plan may actually pay for the population that actually purchases its product may differ quite significantly from the computed actuarial value. A study conducted by the respected Milliman actuarial firm confirms that, in fact, these departures are significant and widespread. Gold plans, for example, in fact often have cost sharing either well below 80% or well above 80%. *See* Pedro Alcoer, *Actuarial Value, Benefit Richness, and the Implications for Consumers*, MILLIMAN (Oct. 29, 2015), <http://us.milliman.com/insight/2015/Actuarial-value--benefit-richness--and-the-implications-for-consumers/> [<https://perma.cc/23NX-RT6P>].

49. CMS appears to have regarded the construction of the hypothetical population used in the Actuarial Value Calculators to have been its greatest challenge. The pool of insureds who would actually purchase Qualified Health Plans on the Exchanges was unknown; moreover plans exactly like those that would be sold on the Exchanges were difficult to find. CMS or some entity with which it contracted went through an elaborate process of using data on insureds under other types of plans to construct what their medical expenses would be under plans with the various tiers of actuarial values.

50. 45 C.F.R. § 156.20.

“Gold.”⁵¹ As a result of § 1302(d)(2)(A) of the ACA,⁵² it does not matter whether the pool of insureds purchasing a particular plan actually has medical expenses that conform to those of the hypothetical pool; the actuarial value of the plan remains constant because it is defined as a function of plan design and an imaginary population with a fixed distribution of medical expenses.

To map from the infinite space of cost sharing combinations to a single number—actuarial value—is an extremely difficult task. It is one that is necessary, however, if insurers are to be permitted continued freedom in sculpting policies while ultimately giving consumers some coarse ultimate metric with which to compare policies. The tool selected by the government to conduct this mapping is a Microsoft Excel spreadsheet that is revised and reissued each year. The spreadsheet is called “The Actuarial Value Calculator,”⁵³ into which the insurer inputs upwards of 200 cost

51. An individual might face what turned out to be quite a different fraction of cost sharing than the actuarial value number might prognosticate. Even if the plan had an 80% actuarial value (thus defined) and was thus labeled “Gold,” the individual with very low medical expenses would end up with a plan that in which the insurer paid far less than 80% of covered medical expenses. The insured might pay most expenses due to the deductible. Conversely, an individual purchasing that same plan who had very high covered medical expenses might end up with a plan in which the insurer paid far more than 80% of covered medical expenses. The insured might pay a low percentage since all of the policies have a “maximum out of pocket limit” (MOOP) that compels insurers to pay 100% of covered expenses after some threshold is reached.

52. See 42 U.S.C. § 18022(d)(2)(A) (“Under regulations issued by the Secretary, the level of coverage of a plan shall be determined on the basis that the essential health benefits described in subsection (b) shall be provided to a standard population (and without regard to the population the plan may actually provide benefits to).”).

53. One can download the Actuarial Value Calculators from CMS at the following URLs: (1) *2014 Actuarial Value Calculator*, CTR. FOR MEDICARE & MEDICAID SERVS., <https://www.cms.gov/CCIIO/Resources/Regulations-and-Guidance/Downloads/av-calculator-final.xlsx> [https://perma.cc/PJ47-MYFR] (last visited Apr. 12, 2016); (2) *2015 Actuarial Value Calculator*, CTR. FOR MEDICARE & MEDICAID SERVS., <https://www.cms.gov/CCIIO/Resources/Regulations-and-Guidance/Downloads/2015-av-calculator-final.xlsx> [https://perma.cc/PJ47-MYFR] (last visited Apr. 12, 2016); (3) *2016 Actuarial Value Calculator*, CTR. FOR MEDICARE & MEDICAID SERVS., <https://www.cms.gov/CCIIO/Resources/Regulations-and-Guidance/Downloads/Final-2016-AV-Calculator-011514.xlsx> [https://perma.cc/PJ47-MYFR] (last visited Apr. 12, 2016); and (4) *2017 Actuarial Value Calculator*, CTR. FOR MEDICARE & MEDICAID SERVS., <https://www.cms.gov/CCIIO/Resources/Regulations-and-Guidance/Downloads/Final-2017-AV-Calculator-2017.xlsx> [https://perma.cc/PJ47-MYFR] (last visited Apr. 12, 2016) (still technically a draft).

sharing parameters.⁵⁴ The spreadsheet then uses the fifteen or so tabs worth of data it contains along with its embedded “macros”—basically custom programs buried inside the spreadsheet—to compute an actuarial value for the plan. The Actuarial Value Calculator then tries to assign the plan to a metal level (or, as it is sometimes called, a “metal tier”).

Figure 1 contains a screenshot of the tab of the spreadsheet on which an insurer inputs values.

Figure 1

The screenshot shows a spreadsheet interface for configuring a health plan. It is divided into several sections:

- User Inputs for Plan Parameters:** Includes checkboxes for 'Use Integrated Medical and Drug Deductible?' and 'Apply Integrated Copay per Day?'. It also has fields for 'Apply Skilled Nursing Facility Copays per Day?' and 'Use Separate OOP Maximum for Medical and Drug Spending?'. A dropdown menu for 'Desired Metal Tier' is set to 'PPO'.
- HSA/HRA Options:** Fields for 'HSA/HRA Employer Contribution?' and 'Annual Contribution Amount:'.
- Narrow Network Options:** Fields for 'Blended Network/POS Plan?' and '2nd Tier Utilization:'.
- Tier 1 Plan Benefit Design:** A table with columns for 'Medical', 'Drug', and 'Combined'. It includes fields for 'Deductible (\$)', 'Coinsurance (%; Insurer's Cost Share)', and 'OOP Maximum (\$)'.
- Tier 2 Plan Benefit Design:** A similar table for a second tier of benefits.
- Benefit Details Table:** A large table with columns: 'Type of Benefit', 'Subject to Deductible?', 'Subject to Coinsurance?', 'Coinsurance, if different', 'Copay, if separate', 'Subject to Deductible?', 'Subject to Coinsurance?', 'Coinsurance, if different', and 'Copay, if separate'. It lists various services like 'Emergency Room Services', 'Primary Care Visit to Treat an injury or illness', 'Specialist Visit', 'Imaging (CT/PET Scans, MRIs)', 'Rehabilitative Speech Therapy', 'Outpatient Facility Fee', 'Outpatient Surgery Physician/Surgical Services', and 'Drugs'.
- Options for Additional Benefit Design Limits:** A section with checkboxes for 'Set a Maximum on Specialty Rx Coinsurance Payments?', 'Set a Maximum on Specialty Rx Coinsurance Maximum:', 'Set a Maximum Number of Days for Charging an IP Copay?', 'Begin Primary Care Cost-Sharing After a Set Number of Visits?', and 'Begin Primary Care Deductible/Coinsurance After a Set Number of Copays?'.
- Output:** A 'Calculate' button and fields for 'Status/Error Messages:', 'Actuarial Value:', and 'Metal Tier:'.

We thus have regulation by calculator. If the Calculator pops out a Metal Level value for the plan, then the plan is basically deemed to satisfy statutory requirements.⁵⁵ If the Calculator pops out an actuarial value for the plan that is not in the requisite ranges, then

54. Instructions on how to do this are provided in a thirty-page online document: CTR. for MEDICARE & MEDICAID SERVS., FINAL 2016 ACTUARIAL VALUE CALCULATOR METHODOLOGY (2015), <https://www.cms.gov/CCIIO/Resources/Regulations-and-Guidance/Downloads/Final-2016-AV-Calculator-Methodology.pdf> [<https://perma.cc/2TTE-VTLU>].

55. 45 C.F.R. § 156.135(a) (“Subject to paragraphs (b) and (d) of this section, to calculate the AV of a health plan, the issuer must use the AV Calculator developed and made available by HHS for the given benefit year.”).

the plan generally may not be sold.⁵⁶ From a broader perspective, we can now have regulations that engage at varying levels of complexity. The person who does not want to invest heavily in an understanding of insurance and plan complexity can simply look at a single number. The person who wants to play in “expert mode” can still find out—albeit with some difficulty—far more detail on how the plan works. The Calculator thus potentially makes more complex regulatory schemes possible while still providing what is, in effect, a useful approximation to those with lower information requirements.

The facilitation of complex regulation that is incomprehensible to most without a calculator makes it important that whatever simplifying calculator is made available be intelligently and openly designed. The Actuarial Value Calculator developed as part of the ACA has deficiencies from this standpoint. Although the elements that make the Calculator work, and that thus implement the regulations, are technically open—one can look at the data and, with some skill, disinter the code from within Excel—in fact the system and the process by which it was created is quite opaque.

To begin with, the provenance of the calculator cannot be readily determined. It is unknown the extent to which CMS performed this work in house and the extent to which it had assistance from outside contractors.⁵⁷ One does not know with any

56. *Id.* There are two exceptions. First, to the extent a plan’s parameters cannot be entirely shoehorned into the framework of the Actuarial Value Calculator—it has special cost sharing rules such as, perhaps, higher level cost sharing on weekends—the Actuarial Value Calculator must still be used, but an actuary certified by the American Academy of Actuaries must explain the reason for the deviation and that the deviation itself reflects sound actuarial principles. Therefore, one does not really escape the Actuarial Value Calculator. The second exception arises if a state develops its own actuarial value calculator based on state-specific data. Although this exception might appear to provide a simple escape route from whatever deficiencies exist with the CMS-created Actuarial Value Calculator, a 25-page “regulatory guidance” issued by CMS creates enormous barriers. These hurdles include (1) submission of data and methods two years in advance—thereby insuring that the data will be inaccurate; (2) requirements that the continuance tables contain at least 100,000 persons per metal tier—thereby deterring small states from using the methodology; (3) apparent prohibitions on extrapolation of data on persons insured for only part of a year—thereby further limiting the sources of data; and a host of other burdens that appear designed to thoroughly discourage any state seeking to compete with or correct the federal effort.

57. There is some indication that Acumen LLC, a business that describes itself as “cater[ing] primarily to federal agencies within the Department of Health and Human Services,” and Blue Health Intelligence, a trade name of Health Intelligence Company, LLC, an independent licensee of the Blue Cross Blue Shield Association, played some role during 2014 in evolving the calculator. *See Clients of*

certainty, therefore, the level of competence of those constructing the calculator or whether its creators had any incentives to structure its methodologies and output in any particular way. For example, if the Calculator generally overstated the aggregate medical expenses of individuals, plans would be labeled as more generous than they in fact were; a plan labeled as Platinum might in fact provide only a Silver or Gold level of benefits. If the Calculator generally understated the aggregate medical expenses of individuals, plans would be labeled as less generous than they in fact were; a plan labeled as Gold might provide a Platinum level of benefits. Not only could departures from reality with respect to aggregate medical expenses result in erroneous labeling, but because cost sharing depends on the interplay of distributions for many kinds of medical expenses—emergency room visits, imaging costs, pharmaceutical costs—errors, (inadvertent or otherwise) in any of those distributions, could result in the wrong metal level being affixed on the policy. Comments on the Actuarial Value Calculator as initially unveiled to correct any problems were not supposed to go to an identifiable human but rather to a general email address. The Federal Register generally creates greater accountability by identifying a specific human being to whom questions or comments on some section of a proposed regulation may be sent.

Second, the data used in the spreadsheets is described rather poorly,⁵⁸ and the process by which the data was developed is only

Acumen, ACUMEN, <http://www.acumenllc.com/clients/default.html> [<https://perma.cc/YM7S-RDUK>] (last visited Apr. 12, 2016); *HHS Centers for Medicare & Medicaid Services* → \$10.5m *Acumen, LLC*, GOVTRIBE, <https://govtribe.com/contract/award/gsl0f0133s-hhsm500201100124g> [<https://perma.cc/AE4Z-PRY2>] (last visited Apr. 12, 2016) (listing Acumen as receiving over \$4 million from CMS to use “BHI data” to develop a standard population as part of the Actuarial Value Calculator). The payments to Acumen came as “modifications” of a rather distinct contract to work on the Medicare Prescription Drug Rebate program and thus are unlikely to have been the subject of any competitive bidding. *Id.* It appears that Acumen received \$117 million from CMS during the period 2013-2016. *Acumen, LLC Burlingame CA (DBA Medric)*, GOVTRIBE, <https://govtribe.com/vendor/acumen-llc-burlingame-ca-dba-medric> [<https://perma.cc/53HF-D57B>] (last visited Apr. 12, 2016). I could not find any information, however, on who may have performed the earlier work in 2012 when the calculator was first developed. The American Academy of Actuaries contributed to some of the ideas that found their way into the calculator. See AM. ACAD. ACTUARIES, ISSUE BRIEF: ACTUARIAL VALUE UNDER THE AFFORDABLE CARE ACT (2011), http://www.actuary.org/pdf/health/Actuarial_Value_Issue_Brief_072211.pdf [<https://perma.cc/L8D3-RJG9>].

58. The data is described in ACTUARIAL VALUE CALCULATOR METHODOLOGY, *supra* note 10, a publication of the federal Department of Health

sketched in that document and, insofar as can be determined, was not the subject of prior notice. There is no technical appendix showing how this was done nor is there any sample data provided from which the methods selected by the executive branch might be replicated or criticized. It is, for all intents and purposes, a black box. Whether the underlying data is accurate or not is essentially impossible to assess.

Not only is the data essentially impossible to assess, so too is the programming that, in combination with the data and user input, produces the purported actuarial value of the plan. Whether the Calculator conforms to the regulations or actually calculates what is intended is extraordinarily difficult to determine.⁵⁹ The code, written in Visual Basic for Applications—a Microsoft proprietary language not generally known for building complex applications—contains no hints or “comments” that explain its meaning or purpose.⁶⁰ This absence of explanation is contrary to Microsoft’s own recommendations⁶¹ and is almost universally considered poor

and Human Services. The document focuses substantially on why the sample it selected on which to base the calculator, a commercial and non-public dataset that looked at employer-based plans and individual plans, and the effort to reverse engineer cost sharing parameters out of the dataset. There is also significant discussion of how to weight the data by the age and gender of the insured, how to cost out benefits required by the ACA but not included in many of the studied plans, and how to impute a “metal level” and actuarial value to each of the plans studied.

59. It is hardly uncommon for Microsoft Excel spreadsheets to contain coding errors, even when prepared by respected academics from the most prestigious institutions. *See, e.g.*, Kevin Roose, *Meet the 28-Year-Old Grad Student Who Just Shook the Global Austerity Movement*, NYMAG.COM (Apr. 18, 2013), <http://nymag.com/daily/intelligencer/2013/04/grad-student-who-shook-global-austerity-movement.html> [<https://perma.cc/3DAQ-FZNL>] (describing error by Harvard professors in spreadsheet).

60. A suspicious mind would be entitled to wonder whether those who wrote the code deliberately removed documentation in order to prevent assessment or reverse engineering. I have extensive experience in computer programming, and I find it extremely difficult to believe that a single individual wrote this code during the time frame between the unveiling of the idea, February 2012, and the release of a working draft in November 2012. If multiple individuals were involved in the programming, it would have been virtually essential that the code have been documented so that each could communicate to the other what the various code components were doing and how they might interface with other components.

61. *Comments in Code (Visual Basic)*, MSDN.MICROSOFT.COM, <https://msdn.microsoft.com/en-us/library/bx185bk6.aspx> [<https://perma.cc/2BJE-BE9J>] (last visited Apr. 12, 2016) (“It is good programming practice to begin all procedures with a brief comment describing the functional characteristics of the procedure (what it does). This is for your own benefit and the benefit of anyone else who examines the code.”); MICROSOFT, SPREADSHEET COMPLIANCE IN THE 2007 MICROSOFT OFFICE SYSTEM (2006), <http://download.microsoft.com/download/a/e/5/>

programming practice.⁶² The only English language material that might contend for status as “documentation” is an explanation of the sequence of computations contained in a November 2012 document “Patient Protection and Affordable Care Act; Actuarial Value Calculator Methodology” released by CMS, but there is no mapping provided between the computations sketched in that document and

ae5f12c6-419d-43bd-937f-f9af7a820c32/BI_Whitepaper_SpreadsheetCompliance [https://perma.cc/73FJ-XGLM].

62. See generally ROBERT C. MARTIN, CLEAN CODE: A HANDBOOK OF AGILE SOFTWARE CRAFTSMANSHIP (2009).

Here is an example of some inscrutable uncommented code contained in one of the thousands of lines of macro code:

```
If Worksheets(Sheetstr).Cells(ded_row, (6 + multiply)).Value <> “.” Then
ded_amt = Worksheets(Sheetstr).Cells(ded_row_low, (6 +
multiply)).Value + (Worksheets(Sheetstr).Cells(ded_row, (6 +
multiply)).Value - Worksheets(Sheetstr).Cells(ded_row_low, (6 +
multiply)).Value) * ded_ppt
ded_freq = Worksheets(Sheetstr).Cells(ded_row_low, (6 +
multiply2)).Value + (Worksheets(Sheetstr).Cells(ded_row, (6 +
multiply2)).Value - Worksheets(Sheetstr).Cells(ded_row_low, (6 +
multiply2)).Value) * ded_ppt
If coins_var = 2 And Sheet1.CheckBoxes(“ofv_copay_limit”).Value = 1
Then
ded_amt = Worksheets(Sheetstr).Cells(ded_row_low, (6 +
multiply_ofv)).Value + (Worksheets(Sheetstr).Cells(ded_row, (6 +
multiply_ofv)).Value - Worksheets(Sheetstr).Cells(ded_row_low, (6 +
multiply_ofv)).Value) * ded_ppt - ded_amt
ded_freq = Worksheets(Sheetstr).Cells(ded_row_low, (6 +
multiply2_ofv)).Value + (Worksheets(Sheetstr).Cells(ded_row, (6 +
multiply2_ofv)).Value - Worksheets(Sheetstr).Cells(ded_row_low, (6 +
multiply2_ofv)).Value) * ded_ppt - ded_freq
End If
If Sheet1.CheckBoxes(“lesser_of”).Value = 1 And ded_freq > 0 Then
If ded_amt / ded_freq < Sheet1.Range(cellvalue2).Value Then
copay_amt = ded_amt / ded_freq
End If
End If
End If
oop = oop - copay_amt * (Worksheets(Sheetstr).Cells(ded_row_low, (6 +
multiply2)).Value + (Worksheets(Sheetstr).Cells(ded_row, (6 +
multiply2)).Value - Worksheets(Sheetstr).Cells(ded_row_low, (6 +
multiply2)).Value) * ded_ppt)
If coins = 1 Then
eff_coins = eff_coins + (((Worksheets(Sheetstr).Cells(88, (6 +
multiply)).Value) / (Worksheets(Sheetstr).Cells(88, (6 +
multiply2)).Value) - copay_amt) * (Worksheets(Sheetstr).Cells(88, (6 +
multiply2)).Value))
End If
```

the actual code contained in the spreadsheet's macros. There is also no obvious application programming interface (API)⁶³ by which the code can be subjected to automated testing that has become fairly standard in the software industry⁶⁴ or that would permit insurers contemplating plans designed to do anything better than hand-craft and hand-tweak their proposed policies.⁶⁵

Worse still, there is internal inconsistency in the data contained in the Calculators. There are two columns in the data that should have an indisputable mathematical relationship to each other. Column C contains, for each bucket into which "total allowed charges" are grouped, what purports to be the mean of the distribution of total allowed charges but with values censored not to lie above the top of each bucket. Column D contains, for each bucket into which "total allowed charges" are grouped, what purports to be the mean of the distribution of total allowed charges with no censoring. Mathematically, then, one can derive Column C from

63. An API may be thought of as a method that permits computer programs to speak with each other. Right now, to get an Actuarial Value of 70%, an insurer must essentially input values into the calculator, see the result and then make a guess as to what economically sensible alternations of the 200 parameters might cause the result to move towards the 70% value. An API would permit an insurer to have the computer throw a variety of cost sharing parameters at the Calculator and have it return for further analysis a list of actuarial values. An API would essentially turn the Actuarial Value Calculator into a function that could be called from another program, one not necessarily written in Visual Basic for Applications but perhaps public domain languages, such as R or Python or Java, or powerful proprietary languages, such as MATLAB or The Wolfram Language (Mathematica). Such an architecture would permit the logic of the calculator to be probed more efficiently and let insurers develop emulators that would let them understand and, if need be, criticize the models that are now latent within the calculator. One actuary apparently attempted to get around this problem by attempting to hack the Calculator. See *Actuarial Value Calculator Is Posted [Archive]*, ACTUARIAL OUTPOST (Nov. 23, 2012), http://www.actuarialoutpost.com/actuarial_discussion_forum/archive/index.php/t-251605.html [<https://perma.cc/762L-PFP6>] (discussing efforts to "de-VBA-ify the spreadsheet").

64. See generally DOROTA HUIZINGA & ADAM KOLAWA, AUTOMATED DEFECT PREVENTION: BEST PRACTICES IN SOFTWARE MANAGEMENT (2007). See also Dudekula Mohammad Rafi et al., *Benefits and Limitations of Automated Software Testing: Systematic Literature Review and Practitioner Survey*, PROC. 7TH INT'L WORKSHOP ON AUTOMATION SOFTWARE TEST, June 2012, at 36, 36.

65. Some actuaries evidently tried to test the 2014 version of the software and found bizarre errors: reducing the amount the insurer paid ended up, in some situations, increasing the actuarial value of the plan. See *Actuarial Value Calculator Is Posted*, supra note 63 (containing discussions of "afg5008," "lifishing007," and "bamafan" on thread on February 20, 2013). It is not clear whether this particular bug was ever fixed by CMS.

Column D using the following formula: $C_j = \sum_{1 \leq i \leq N} (f_i \min(D_i, t_j))$, where i is an index over the N buckets into which the data is grouped; f_i is the probability an individual falls into the i th bucket; D_i is the value in Column D for the i th bucket; and t_j is the highest value in bucket j . Unfortunately, try as one might, Column C simply cannot be derived from Column D. One must therefore conclude that one of the columns of data is not correct or, more likely, that the documentation describing the data is flawed.⁶⁶ Neither alternative is particularly comforting.

In short, if spreadsheets such as the Actuarial Value Calculator are the same as law, then they need to be treated as law by executive agencies. This means applying the full protections of the Administrative Procedure Act and other federal contracting statutes to the creation of the spreadsheet, including an opportunity for meaningful feedback. Inadequate code documentation, opaque procurement procedures, failure to provide information on the transformation of data, and an effective inability to test the code—all of which occurred and continue to occur with the Actuarial Value

66. Here is the explanation of Column C taken from CMS's memorandum describing the 2016 Actuarial Value Calculator. Essentially identical language is used in describing preceding Calculators. CTR. FOR MEDICARE & MEDICAID SERVS., *supra* 54, at 13.

The continuance tables rank enrollees by allowed total charges (after any provider discounts but before any member cost-sharing) and group them by ranges of spending. These ranges of spending define the rows of the continuance table. The data are then used to calculate the number of enrollees with total spending falling within each range, the cumulative average cost in the range for all enrollees, and the average cost for all enrollees whose total spending falls within the range.

Id. CMS provides a similar explanation in its “do-it-yourself” memorandum provided to the states in the event they wished to build their own actuarial value calculator. See CENTER FOR CONSUMER INFORMATION & INSURANCE OVERSIGHT, STATE TECHNICAL ASSISTANCE ON STATE-SPECIFIC DATA FOR THE ACTUARIAL VALUE CALCULATOR (Aug. 15, 2014), <https://www.cms.gov/CCIIO/Resources/Regulations-and-Guidance/Downloads/final-state-avc-guidance.pdf> [https://perma.cc/G95X-KL3Z]. Avg. Cost per Enrollee (Max'd): This is the average spending of all enrollees in the dataset, if enrollees that spent above the bracket limit were top-coded to the value of the bracket limit. This is equal to [(total spending of all enrollees with spending up to bracket) + (total number of enrollees – number of enrollees up to bracket) * (bracketupper limit)]/total n. The computation described here is precisely the one I have done on the data provided, except that the numbers that result do not match the numbers one obtains from the formula. Efforts to speak to appropriate persons at the Centers for Medicare and Medicaid Services about this issue were unsuccessful.

Calculator—provide far too much discretion to even the best intentioned executive agencies.

III. USING THE ACTUARIAL VALUE CALCULATOR TO ASSESS TRANSITIONAL REINSURANCE

Notwithstanding these issues, the evolution of the Actuarial Value Calculator is still immensely useful for understanding the Affordable Care Act and the state of American healthcare. For one thing, the data the spreadsheets contain is an unprecedented treasure trove of information previously locked up, essentially as insurer trade secrets,⁶⁷ as to the distribution of medical expenses in aggregate and various subcategories among the American public. As discussed, this data may not be fully accurate, but for some purposes it is better than the nothing that otherwise exists for many researchers in the field.

Not only does the Actuarial Value Calculator provide information on the distribution of claims within a given year, the sequence of Actuarial Value Calculators that will be produced each year should provide valuable information on the healthcare Exchanges established by the ACA that currently provide health insurance to about 12 million Americans, perhaps more in the future.⁶⁸ Whether the ACA is, as many fear, heading into a death spiral and, if so, the particular physics of that spiral are strongly

67. If one looks at the UNITEDHEALTHCARE INS. COMPANY, FEDERAL RATE FILING JUSTIFICATION PART III ACTUARIAL MEMORANDUM & CERTIFICATION FOR UNITED HEALTHCARE INSURANCE COMPANY STATE OF KENTUCKY RATE REVIEW (2015), https://insurance.ky.gov/ratefil/RFDocuments/2015-005963-R_3.pdf [<https://perma.cc/2XC6-HSAL>], for example, which purports to justify an insurer's decision to raise rates for plans sold pursuant to the ACA, one sees massive portions redacted to preserve proprietary information.

68. The Congressional Budget Office most recently estimated that about 13 million people would be enrolled in Qualified Health Plans on the Exchanges during 2016. Even if these estimates, like many other CBO estimates concerning the ACA, are incorrect, see, for example, Seth Chandler, *CBO Projection of \$8 Billion from Risk Corridors Is Baffling*, ACA DEATH SPIRAL (Feb. 7, 2014), <http://acadeathspiral.org/2014/02/07/cbo-projection-of-8-billion-from-risk-corridors-is-baffling> [<https://perma.cc/28YP-TEXX>] (noting, correctly as it turns out, that the CBO's estimate that an ACA program known as Risk Corridors would earn \$8 billion for the government was baffling; in fact Risk Corridors lost about \$2.5 billion); DEP'T HEALTH & HUM. SERVS., RISK CORRIDORS PAYMENT PRORATION RATE FOR 2014 (2015), <https://www.cms.gov/CCIIO/Programs-and-Initiatives/Premium-Stabilization-Programs/Downloads/RiskCorridorsPaymentProrationRatefor2014.pdf> [<https://perma.cc/RH7U-CCVH>], still the number of those enrolled will be substantial.

hinted at by the evolving Actuarial Value Calculator. We can assess, for example, the effects of changes in a program known as Transitional Reinsurance⁶⁹ using the Actuarial Value Calculators.

I now examine two issues clarified by the series of Actuarial Value Calculators created pursuant to the ACA. First, I look at the evolution of claims in the first years of the ACA. I show that claims are increasing for all metal tiers. Second, I look at the effects of the phase out of the Transitional Reinsurance program.

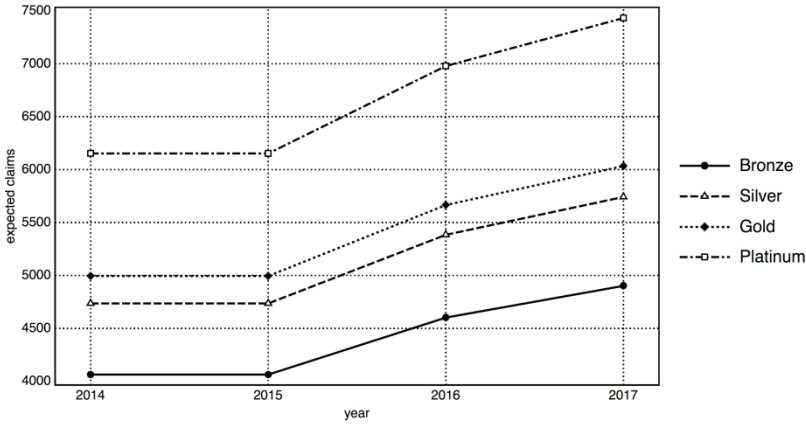
A. The Evolution of Claims in the Early Years of the Affordable Care Act

The data in the Actuarial Value Calculator contains the government's estimates of the expenses insurers are likely to face on average when they sell policies in the exchange in a given year. The composite graphic below shows the changes in the mean expected claim for each of the four metal groups for the period 2014 to 2017. The top panel shows the increases in graphical form. The bottom left panel shows the expected claims for each of the four metal levels in each of the four years for which we have an Actuarial Value Calculator with continuance tables. The bottom right panel shows the average annual rate of increase for the four metal levels, which is between 6.3% and 6.4%. There is no increase between 2014 and 2015 because CMS, the agency that ended up with regulatory authority over the matter, felt it did not have adequate data as of early 2014 to warrant a change.⁷⁰ The 2016 increases shown below are thus, in some sense, a form of "catch-up" for the failure to update in 2015.

69. 42 U.S.C. § 18061 (2010).

70. In 2014, CMS finalized 45 C.F.R. § 156.135(g) (2014), which requires the Executive to update the continuance tables to reflect more current claims data only every three years and only to "trend" the claims data when the trending factor is more than 5% different, calculated on a cumulative basis. It is not clear how one can "trend" the claims data, however, without altering the continuance tables or, more relevantly, how any result from the Calculator would change unless the continuance tables were changed.

Figure 2
EVOLUTION OF EXPECTED CLAIMS
AS COMPUTED USING THE ACTUARIAL VALUE CALCULATOR



	2014	2015	2016	2017
Bronze	4064	4064	4603	4903
Silver	4737	4737	5385	5743
Gold	4996	4996	5666	6035
Platinum	6154	6154	6980	7433

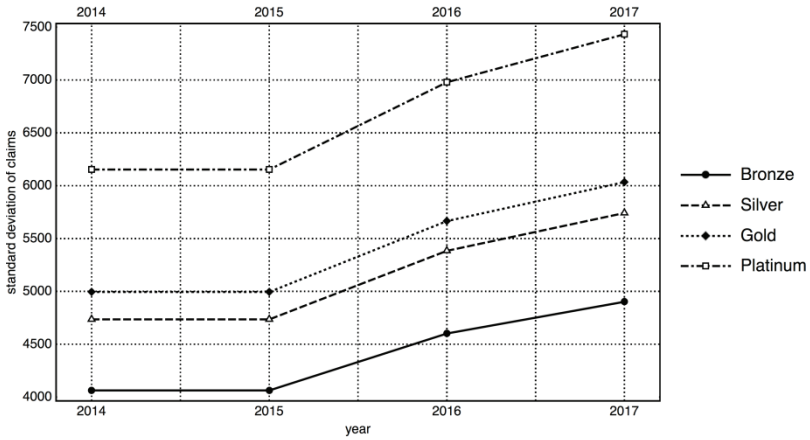
2 levels | 4 rows

Bronze	0.063
Silver	0.064
Gold	0.063
Platinum	0.063

1 level | 4 elements

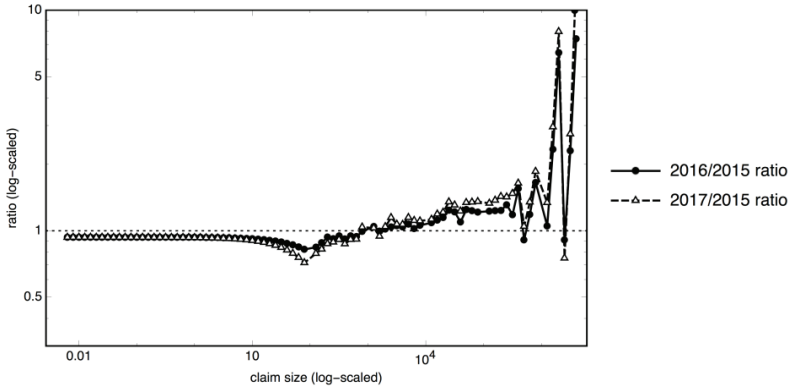
One can also use data from the Actuarial Value Calculators to examine the variability of claims for each metal level as they evolve over time. Here we see the same temporal pattern: the standard deviation gets larger as we move from 2015 through to 2017. And the relative ranking of Bronze, Gold, and Platinum remains the same as with expected claims. Silver plans consistently have the highest variability, however. The reason for Silver’s greater variability is not known but possibly occurs because plans that are called “Silver” in fact have differing actuarial values (ranging from 70% to 94%), depending on the income of the insured and may thus draw from medically diverse populations.

Figure 3
EVOLUTION OF STANDARD DEVIATION OF CLAIMS
AS COMPUTED USING THE ACTUARIAL VALUE CALCULATOR



Because an exclusive focus on just the mean of a distribution loses valuable information, it is also worthwhile to examine the distribution of claims themselves for each year and among the four metal levels. Figures 4 through 7 show the results. The x-axis on each of these graphs shows the size of the claim. The values are log-scaled for clarity. The y-axis on each graph shows the ratios of the probability density function of the claim distribution for each year relative to the probability density function of the claim distribution for the 2015 baseline. A value greater than 1 means that claims around the associated x-value in the given year were denser than they were in 2015. A value less than 1 means that the claims were less dense around the associated x-value in the given year than they were in 2015.

Figure 4
BRONZE



For Bronze claims, one can see that the claims tended to be waited more heavily at the higher levels as one moves from 2016 to 2015 (represented with solid lines and circular plot markers) and from 2017 to 2015 (represented with dashed lines and triangular markers). The solid line is below 1 at the lower claim sizes and tends to be higher than 1 at the higher claim sizes. The dashed line follows the same pattern and tends to show a more dramatic effect.

We can see the same pattern for Silver, Gold, and Platinum policies: a greater emphasis as time goes on higher valued claims.

Figure 5
SILVER

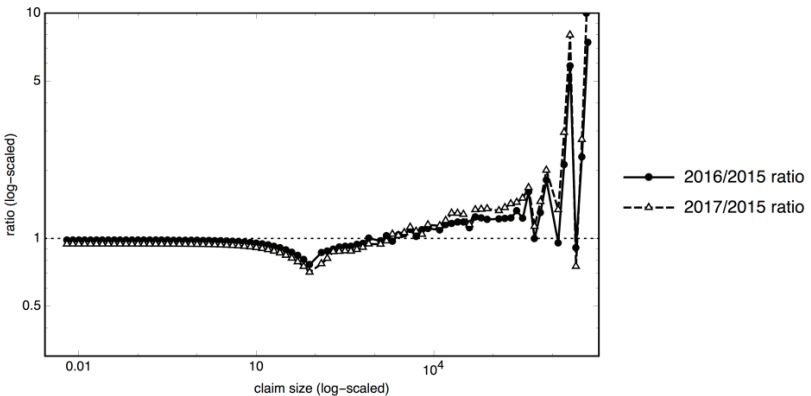


Figure 6
GOLD

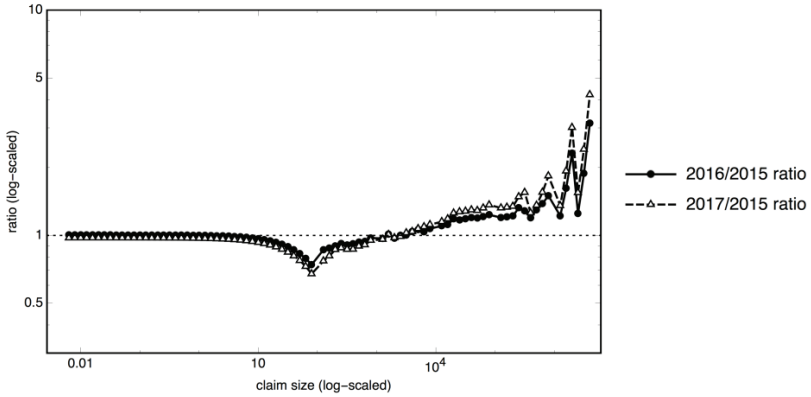
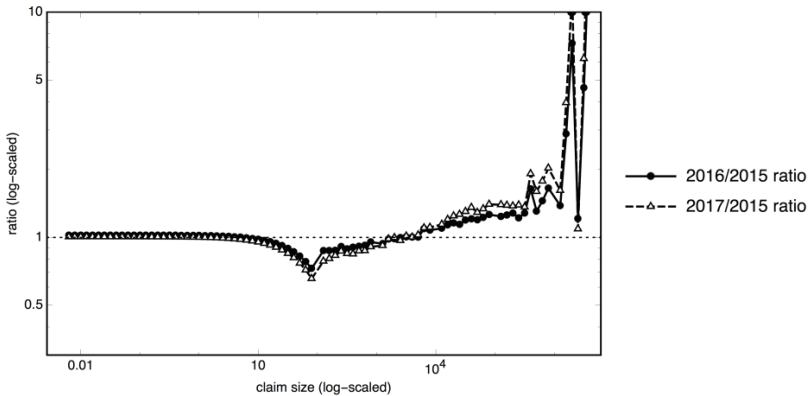


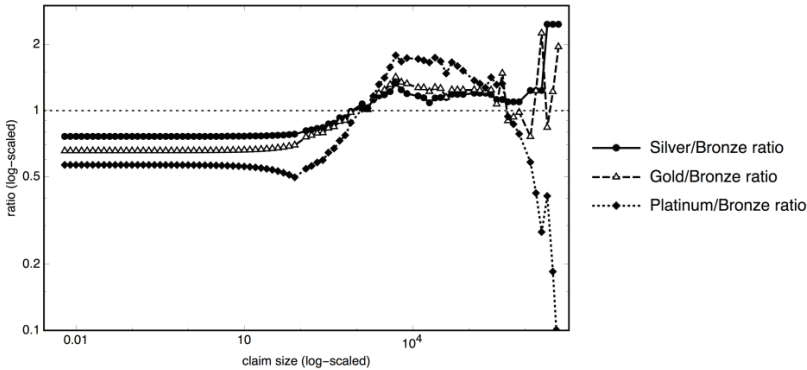
Figure 7
PLATINUM



One can similarly examine the distribution of claims themselves for each metal level among the three years 2015, 2016, and (projected) 2017. The same type of graphic is used: The x -axis on each of these graphs shows the size of the claim. The values are log-scaled for clarity. The y -axis on each graph shows the ratios of the probability density function of the claim distribution for each of the other metal levels (Silver, Gold, Platinum) relative to the probability density function of the claim distribution for the Bronze baseline. A value greater than 1 means that claims around the associated x -value for the given metal level were denser than they were for Bronze. A value less than 1 means that the claims were less

dense around the associated x -value for the given metal level than they were for Bronze.

Figure 8
2015



The pattern for 2015 is that Silver, Gold, and Platinum are all less dense than Bronze among the lower valued claims but generally higher for almost all of the upper valued claims. The picture is generally as one would expect: Platinum, for most of its upper range, has the highest density of claims relative to Bronze; Gold next densest; and Silver densest after that. This pattern reflects the sort of “induced demand effect” one would expect to see given adverse selection issues in which people who expect high medical claims tend to purchase plans with less cost sharing, and moral hazard problems in which the existence of lower cost sharing tends less to deter insureds from utilization of costly medical services. Confirmation of induced demand is an unhappy fact for those hoping that the ACA will continue to offer meaningful choices of cost sharing levels on the Exchanges. There is an inexplicable exception for Platinum claims at the highest levels, which the data suggests is less dense than Bronze for the highest valued claims.⁷¹

The patterns for 2016 and 2017, as shown in Figures 9 and 10, are similar to those for 2015.

71. This is exactly the sort of peculiarity that would have been easier to challenge had better procedures been used for collection and publication of the data. See *supra* Part II.

Figure 9
2016

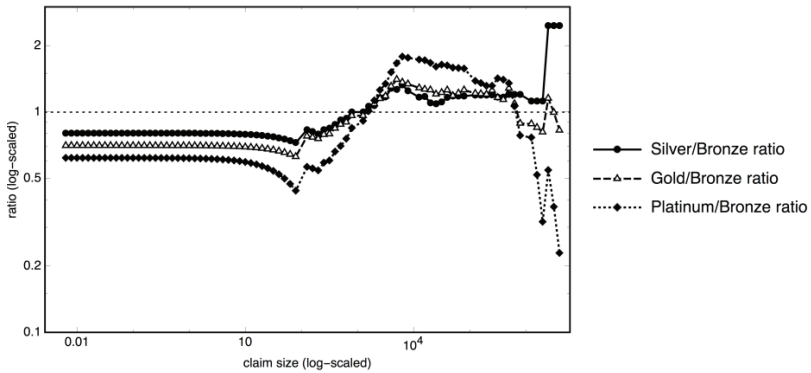
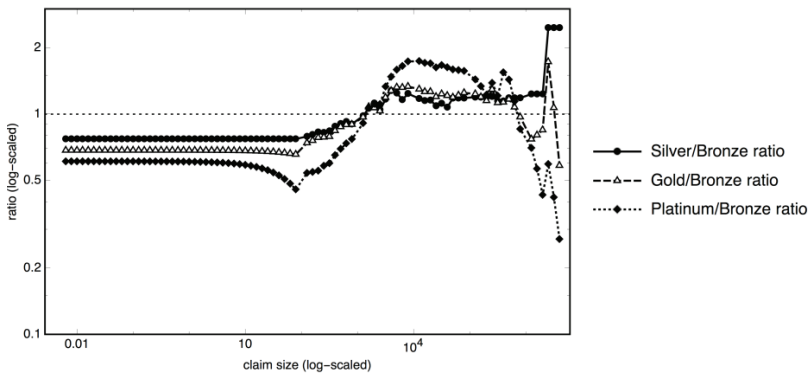


Figure 10
2017



B. A Closer Look at Transitional Reinsurance Premiums

A key provision of the ACA for the first three years in which policies are to be sold on the individual Exchanges is something called “Transitional Reinsurance.” It is established by § 1341 of the statute and, along with “Risk Adjustment” and “Risk Corridors,” is one of the so-called “3Rs” that subsidize insurers selling policies on the Exchanges established by the ACA.⁷² It provides insurers selling policies on the Exchanges with “specific stop loss reinsurance”⁷³

72. 42 U.S.C. § 18061.

73. Reinsurance comes in many flavors; each of which may have more than one name. “Specific stop-loss reinsurance” is a form of reinsurance that tends to have the following features. The “specific” nomenclature distinguishes the

without any charge to those insurers. As it has been implemented by the Obama administration, which may not be precisely what the statute called for,⁷⁴ the reinsurance is triggered when, regardless of the reason, an insurer's payments on behalf of an individual insured exceed an "attachment point." Thereafter, until the payments by the insurer hit a cap, the federal government reimburses the insurer for a fraction of the amount paid by the insurer for the expenses of that particular insured.⁷⁵

This "free" reinsurance⁷⁶ provided under the ACA reduces both the cost and risk of providing insurance on the Exchanges. In a

reinsurance from "aggregate" reinsurance. Specific reinsurance is triggered based on the amount of a particular claim within a pool of insured claims. Thus, even if everyone else in a homeowner pool has no losses and thus the insurer makes an unexpected large profit, specific reinsurance may kick in if one homeowner has a large claim. Aggregate reinsurance, by contrast, is triggered when losses on some portfolio of claims—either the entire pool or some defined subset—incur larger than desired losses. The "stop loss" nomenclature indicates that the purpose of the reinsurance is to—not surprisingly—stop insurer losses, but only after some threshold level of losses have occurred. It is somewhat akin to insurance with a deductible. For a succinct discussion of stop-loss insurance, see *Stop-Loss Excess Insurance*, SIIA: SELF-INSURANCE INSTITUTE OF AMERICA, INC., <http://www.siaa.org/i4a/pages/Index.cfm?pageID=4549> [<https://perma.cc/XUB6-NJJT>] (last visited May 16, 2016).

74. I have addressed the non-statutory triggers used by the Obama administration for Transitional Reinsurance in a lengthy Forbes Magazine blog entry here: Seth Chandler, *How the Obama Administration Raided the Treasury to Pay Off Insurers*, APOTHECARY (Jan. 18, 2016), <http://www.forbes.com/sites/theapothecary/2016/01/18/how-the-obama-administration-raided-the-treasury-to-pay-off-insurers/> [<https://perma.cc/4K57-XMD4>].

75. The Transitional Reinsurance program diminishes the risk posed by a single individual and, derivatively, diminishes the aggregate risk of selling insurance to a pool of individuals. The standard deviation of the sum of similar distributions is generally linearly proportional to the standard deviation of a single element of the sum. The Risk Corridors program created by § 1342 of the ACA, 42 U.S.C. § 18062, more directly reduces the aggregate risk of selling insurance in the Exchanges by essentially offering insurers a free "derivative security" to hedge risk. *But see* Consolidated and Further Continuing Appropriations Act, 2015, Pub. L. No. 113-235, § 227, 128 Stat. 2130, 2491 (preventing government subsidization of Risk Corridors for 2015).

76. Of course, the insurance is not really "free." The Transitional Reinsurance is funded through an assessment on most other health insurance arrangements in the United States. The major exception is health insurance that is "self funded" (no commercial insurer involved) where the plan itself determines what claims to pay—an arrangement used almost exclusively by labor unions. This assessment increases the price of that health insurance and may render it more difficult to afford for some individuals. The assessment was \$63 per "covered life" per month in 2014, \$44 per covered life per month in 2015, and \$27 per covered life per month in 2016. *See* Chandler, *supra* note 74.

competitive market, it should also reduce the gross premiums for health insurance policies sold on the Exchanges, most likely in a form that is neither sensitive to the income of the purchaser nor redistributive. Had the reinsurance not been available, insurers would either have gone without and thereby paid more on claims or would have had to pay commercial reinsurers to lower their conventional attachment points to provide greater protection.⁷⁷ Congress might then have used the money thus liberated to distribute far greater premium subsidies—perhaps as much as 70% more—in an income-sensitive and redistributive way to prospective insureds⁷⁸ that would have made exchange policies far more attractive.

The amount allocated by the ACA to pay for Transitional Reinsurance phases out between 2014 and 2016, going from a maximum of \$10 billion for policies sold in 2014 to \$6 billion in 2015 to \$4 billion for policies sold in 2016.⁷⁹ It was thus anticipated

77. Health insurers frequently purchase specific stop loss reinsurance from the commercial market. The Obama administration, perhaps in an effort not to cut into the reinsurers' business, slid the Transitional Reinsurance of the ACA in at a lower level in the claims stack than what it asserted was the typical \$250,000 attachment level. Patient Protection and Affordable Care Act; HHS Notice of Benefit and Payment Parameters for 2014, 78 Fed. Reg. 15,410, 15,467 (Mar. 11, 2013) ("The parameters would not interfere with traditional commercial reinsurance, which typically has attachment points in the \$250,000 range."); Jane M. Zhu et al., *The Power of Reinsurance in Health Insurance Exchanges to Improve the Fit of the Payment System and Reduce Incentives for Adverse Selection*, 50 INQUIRY 255, 255 (2013), <http://inq.sagepub.com/content/50/4/255.full> [<https://perma.cc/MYE7-B269>]. There is no evidence, however, that if insurers were willing to pay more, reinsurers would not be willing to provide reinsurance similar to that afforded by the ACA.

78. The federal government in fact spent \$15.5 billion on premium tax credits in 2014. See *Affordable Care Act: Interim Results of the Internal Revenue Service Verification of Premium Tax Credit Claims*, TREASURY INSPECTOR GEN. FOR TAX ADMIN. (May 29, 2015), <https://www.treasury.gov/tigta/auditreports/2015reports/201543057fr.html> [<https://perma.cc/4W9M-BEMK>]. If one added the \$10 billion in scheduled Transitional Reinsurance payments to that sum, \$25.5 billion would have been available, which is 70% more. Of course, if more people purchased subsidized policies as a result, the subsidy per individual would increase less than 70%.

79. See 42 U.S.C. § 18061(b)(3)(B)(iii). Somewhat mysteriously, as it turns out, less has actually been spent thus far on this program than was anticipated. See Chandler, *supra* note 74. This diversion of funds from the Treasury to insurance companies is now under active investigation by members of the United States Senate. See Letter from Marco Rubio and Orrin Hatch, Senators, U.S. Senate, to Jack Lew, Sec'y of the Treasury, and Sylvia Burwell, Sec'y of Health & Human Servs. (Mar. 8, 2016), <http://www.rubio.senate.gov/public/index.cfm/2016/3/rubio-hatch-question-administration-on-lawfulness-of-obamacare-reinsurance-payments> [<https://perma.cc/SA59-AGFL>]; Memorandum from Cong. Research Serv. to House

that the subsidies provided insurers would decline and more of the policies' costs would need to be internalized by the insurers themselves and, derivatively, their insureds.

Figure 11 shows the Transitional Reinsurance parameters for each of the three years of the program, both as originally proposed and as ultimately implemented. The first column of the table identifies a particular reinsurance parameter by the year in which it would apply and whether it was an original or final provision.⁸⁰ The second column of the table provides the issue of the Federal Register in which the parameters were announced. The third column of the table identifies the attachment point. If the amount an insurer paid on an individual insured's claim was less than this amount, nothing was paid in reinsurance. The fourth column states the rate at which payments in excess of the attachment amount would be paid. A value of 0.8 in conjunction with an attachment point of \$60,000 therefore means that if the insurer paid \$70,000 on an individual's claims for a year, the reinsurer would reimburse it \$8,000. The fifth column, the cap, is the maximum claim to which the reimbursement would apply. Thus, if the attachment were again \$60,000 and the payment rate was 0.8, an insurer that paid \$300,000 in claims on an expensive individual would be treated for reinsurance purposes as if they had only paid \$250,000. They would thus receive \$152,000 in reimbursement, which is the payment rate multiplied by the difference between the cap and the attachment.

Comm. on Ways & Means & House Comm. on Energy and Commerce (Feb. 23, 2016), <http://energycommerce.house.gov/sites/republicans.energycommerce.house.gov/files/documents/114/analysis/20160223CRS.pdf> [<https://perma.cc/8VRE-W4KA>].

80. There is not yet a "final" set of reinsurance parameters for 2016. And in a development that occurred just before the publication of this Article, it looks as if there may be further revisions to the 2015 parameters. This is so because, while only \$6 billion was supposed to be available for that year, the Centers for Medicare & Medicaid Services believe it will have \$7.7 billion available. CTRS. FOR MEDICARE & MEDICAID SERVS., THE TRANSITIONAL REINSURANCE PROGRAM'S CONTRIBUTION COLLECTIONS FOR THE 2015 BENEFIT YEAR 1 (2016), https://www.cms.gov/CCIIO/Resources/Regulations-and-Guidance/Downloads/RIC_2015ContributionsGuidance.pdf [<https://perma.cc/9Z4R-L3XN>]. Since enrollment for 2015 was somewhat less than projected, the combination of 28% more money and a lower number of reinsured claims might permit CMS to alter its payment rate on 2015 claims from the 0.5 "final" number to something closer to the 1.0 number it ended up using in 2014. Insurers, who may not have banked on the more generous reinsurance, will thus have better bottom lines for 2015. Whether this transient profitability increase will be sufficient to induce more of them to stay in the exchange past 2016, when Transitional Reinsurance likely expires, remains to be seen.

Figure 11

id	FederalRegister	Attachment	PaymentRate	Cap
2014_Original	11 Mar 2013	60 000	0.8	250 000
2014_Final	2 Dec 2013	45 000	1.0	250 000
2015_Original	2 Dec 2013	70 000	0.5	250 000
2015_Final	27 Feb 2015	45 000	0.5	250 000
2016_Original	27 Feb 2015	90 000	0.5	250 000
2levels 5 rows				

A significant concern about implementation of the ACA has been the extent to which gross premiums for policies sold on the Exchanges have increased, particularly in the most recent year. How serious the situation is depends on how one counts. No single way is perfect. Many who have studied the issue believe, however, that increases were over 10% and may have been 20% to 30% for the more generous subtypes of plans (Platinum and PPO).⁸¹ It is doubtful

81. One logical way of proceeding is to look at the premiums for those “persistent plans” sold in both years. This is particularly relevant to people seeking to maintain continuity of networks and may reflect the actual costs of providing insurance. When this is done, one obtains estimates of increases of 12.1% for Bronze plans, 9.4% for Silver plans, 15.2% for Gold plans, and 20.9% for Platinum plans. Seth Chandler, *Prices Rising, Choice Declining for 2016 Obamacare*, ACA DEATH SPIRAL (Oct. 31, 2015), <http://acadeathspiral.org/2015/10/31/prices-rising-choice-declining-for-2016-obamacare> [<https://perma.cc/3R6X-RVZM>] (computing mean change in premiums between 2015 and 2016 for 6,699 persistent plans sold on the federal Exchanges).

This methodology, however, did not weight plans on the basis of enrollment because that data was not readily available at the time. It also looked only at plans sold at HealthCare.gov and not at the smaller fraction of plans sold on the various state-based Exchanges. A similar effort by Charles Gaba, a respected enthusiast for the ACA, likewise looked at persistent plans and attempted to estimate the enrollment of various plans based on state filings. Charles Gaba, *2016 Rate Increases: Where Things Stand Nationally/State-by-State (12-14% Overall)*, ACASIGNUPS.NET (Aug. 28, 2015, 11:48 PM), <http://acasignups.net/15/08/28/2016-rate-increases-where-things-stand-nationallystate-state> [<https://perma.cc/5PSA-74VL>].

Mr. Gaba concluded that the average increase between 2015 and 2016 was between 12% and 14% depending on various details. No effort was made to disaggregate the rates of increase among the various metal levels. This method likewise assumed, however, that enrollees would keep their plans rather than shop and also had the benefit of looking at only two-thirds of the states. Another way of proceeding is to look at premiums not for persistent plans but for certain plan rankings. The Kaiser Family Foundation, for example, looked at the premium for the second lowest Silver plan in various cities throughout the United States. It found a premium increase of only 3.6%. Cynthia Cox et al., *Analysis of 2016 Premium Changes in the Affordable Care Act’s Health Insurance Marketplaces*, HENRY J.

that the ACA can serve all but the low income and those purchasing its least expensive policies if this annual rate of increase were to continue.

Causation is important. If the increases between 2015 and 2016 are due substantially to diminution in government subsidies, this causal structure might actually augur favorably for the stability of the Exchanges once those subsidies disappear. The engine that has been driving those increases—the withdrawal of subsidies—will go away and perhaps leave the system in somewhat of a steady state. If, on the other hand, the decline in the subsidies play an insignificant role, the phenomenon of price increases—particularly in the plans with more lavish benefits—are more likely being significantly caused by the more healthy shift away from the more lavish plans and either choosing not to purchase insurance or selecting one of the less generous plans. Such a withdrawal would leave the more lavish plans with only the least healthy enrollees, drive prices up, and initiate a death spiral that, once complete within the Platinum plans, could easily migrate to Gold plans.

The data embedded within the Actuarial Value Calculators, assuming it is accurate, permits us to get somewhat of a handle on the causation issue. We can derive our own distribution of healthcare expenses and then compute for any arbitrary set of reinsurance parameters the amount that free reinsurance reduces insurer costs and, derivatively, reduced premiums. We can thus see, for example, what premiums would have been in 2015 had the 2014 parameters for Transitional Reinsurance remained in effect and what premiums would have been in 2016 had either the 2015 or 2014 parameters for Transitional Reinsurance remained in effect.

KAISER FAM. FOUND. (Oct. 26, 2015), <http://kff.org/health-reform/fact-sheet/analysis-of-2016-premium-changes-in-the-affordable-care-acts-health-insurance-marketplaces/> [<https://perma.cc/7JQK-F7FP>].

This methodology failed to consider plans with different metal levels, almost all PPO plans (since these are seldom the lowest or second lowest in a category), or plans outside of urban areas. More fundamentally, however, as experimentation using *Mathematica* shows, if the rate of increase for premiums for each insurer observes a Geometric Brownian motion process, the rate of increase observed for the lowest or second lowest premium each year—the mean of the second-order statistics distribution of observations—will understate the average increase for the group, particularly when the process operates over short periods of time. As the number of observations grows, the understatement grows more pronounced. Thus, it could easily both be true that the average rate of increase for premiums was 10% and that the rate of increase for the second lowest premium was 3.6%.

Ordinarily, the details of how that computation can be done might be buried in a never-read appendix or relegated to another excessively long footnote. However, since this is a symposium on computation and an opportunity to permit readers to assess the methodology, I set forth here how this is done in more than cursory fashion.

The difficulties arise in part because the Calculators, although potentially well suited for the task, were not designed with my project in mind and therefore do not expose the underlying data from which certain computations were made. Instead, the Actuarial Value Calculators contain only “lossy⁸² compressed data” and represent healthcare expenses as a discrete distribution, which in fact they are not. Although for many purposes this lossy compression of the data would be sufficient, for understanding Transitional Reinsurance, it is not. This is so because the attachment points and claims limits of the Transitional Reinsurance policies simply may not correspond with the buckets in the Actuarial Value Calculator. Therefore, although we can directly observe the mean claims of people with claims between \$50,000 and \$100,000, and we cannot do this with respect to people with mean claims between \$60,000 and \$100,000, which is what we need to do the requisite computations on the costs of reinsurance. To do the computation properly, we need to derive a plausible continuous distribution.

Here is an illustration of what is involved. Let us consider the projected distribution of covered healthcare expenses for the “AVC [Actuarial Value Calculator] population” among people who purchased a Gold plan in 2016. We can obtain this distribution by

82. There are two types of data compression: lossy and non-lossy. In lossy compression, there is not necessarily a unique set of uncompressed data that can be reverse engineered out of the compressed data. There may be multiple sets of the original data that could map to precisely the same compressed form. The JPEG compression method used for photos and MP3 method used for audio are examples of lossy compression. *What Lossless File Formats Are & Why You Shouldn't Convert Lossy to Lossless*, HOWTOGEEK.COM, <http://www.howtogeek.com/142174/what-lossless-file-formats-are-why-you-shouldnt-convert-lossy-to-lossless/> [<https://perma.cc/4QRJ-EY6C>] (last visited Apr. 12, 2016).

In theory, multiple songs could have exactly the same MP3. In lossless compression, there is a one-to-one correspondence between the original and compressed data. The PNG compression algorithm often used for web graphics, the WAV format sometimes used for audio are examples of lossless compression, *id.*, as is the ZIP file often used to compress text or other computer files. The importance of data compression is the subject of the television series *Silicon Valley*. *Silicon Valley*, HBO, <http://www.hbo.com/silicon-valley/about/index.html> [<https://perma.cc/VSQ5-CNHI>] (last visited Apr. 12, 2016).

examining the “Gold Cont. Table – Combined” tab of the Actuarial Value Calculator for 2016. What we learn from that tab is that 39,750 people (1.02%) of the 3,886,699 people in the sample projected to purchase Gold policies will have covered expenses between \$50,000 and \$100,000 and that the mean expense of those within that “bucket” will be \$67,790. But of course, not everyone who has annual health expenses within that bucket will have precisely the mean value of expenses. Probably no one will. Although the Actuarial Value Calculator shows the distribution of health expenses as discrete—everyone within a bucket pays the mean amount within the bucket—in doing so, the Actuarial Value Calculator is collapsing and making opaque the underlying data (or process) from which it was derived. And so, if we have to look, as we will, at the expenses of people whose expenses range from, for example, \$60,000 up to some certain value, we need to recreate that underlying data.

There are, in fact, an infinite number of distributions of healthcare expenses between \$50,000 and \$100,000 that could result in a mean of \$67,790. CMS lost information when it created the Actuarial Value Calculators. Here is one possible distribution: a 21% chance of having expenses of \$51,000 and a 79% chance of having expenses of \$72,253. Here is another: a 17% chance of having expenses of \$50,068 and an 83% chance of having expenses of \$71,419. Here is yet another one: a continuous distribution whose probability density function is a line with a slope of $6.92 * 10^{-10}$ and a y-intercept of 0.000071912.

There is, however, a distribution known as the “maximum entropy distribution” that is probably the best one to use to make the needed calculations.⁸³ A maximum entropy distribution is the one that makes the fewest assumptions about the shape of the unknown. And for continuous distributions lying within a certain interval and with a specified mean, which is precisely what we have here, the maximum entropy distribution is what is known as a truncated exponential distribution.⁸⁴ Although there is no known closed form

83. E.T. Jaynes, *Information Theory and Statistical Mechanics*, 106 PHYS. REV. 620, 630 (1957) (“In the problem of prediction, the maximization of entropy is not an application of a law of physics, but merely a method of reasoning which ensures that no unconscious arbitrary assumptions have been introduced.”).

84. See DANA KELLY & CURTIS SMITH, *BAYESIAN INFERENCE FOR PROBABILISTIC RISK ASSESSMENT: A PRACTITIONER’S GUIDEBOOK* 190 (2011). The probability density function of a truncated exponential distribution may be written as

solution (a mathematical formula) to determine the parameters of the exponential distribution given the intervals of the bucket and the mean of the distribution,⁸⁵ one can still find the result using fancy forms of trial and error (“numeric analysis”). The method used for this Article was the Nelder-Mead algorithm,⁸⁶ in which one searches a parameter space—here the parameter to an exponential distribution—so as to minimize the square of the difference between the known mean of the bucket and the computed mean of a truncated exponential distribution with that parameter.⁸⁷

What needs to be done therefore is to find, for each of the eighty-four buckets for each of the four metal levels for each of the four years of Actuarial Value Calculators 2014-2017 (844 different buckets altogether), the truncated exponential distribution that is the maximum entropy distribution within that range. We can then create what is known as a “mixture distribution” that provides a continuous representation of the healthcare expenses for each year and for each metal level. A mixture distribution is a compound distribution that first randomly determines what bucket the random variable is in and then determines where within the bucket the random variable falls. Once we have this mixture distribution—and the enterprise of 844 instances of trial and error takes about a minute on a modern high-end personal computer—we have the data in a form on which we can perform the needed computations.

To illustrate, consider the distribution of healthcare expenses of individuals projected to purchase a Gold policy in 2016. The graphic

$\frac{e^{-kx}}{e^{-ak} - e^{-bk}}$ for $a \leq x \leq b$ and zero otherwise, where a is the lower bound of the truncation interval, b is the upper bound of the truncation interval and k is a parameter that affects the slope of the function.

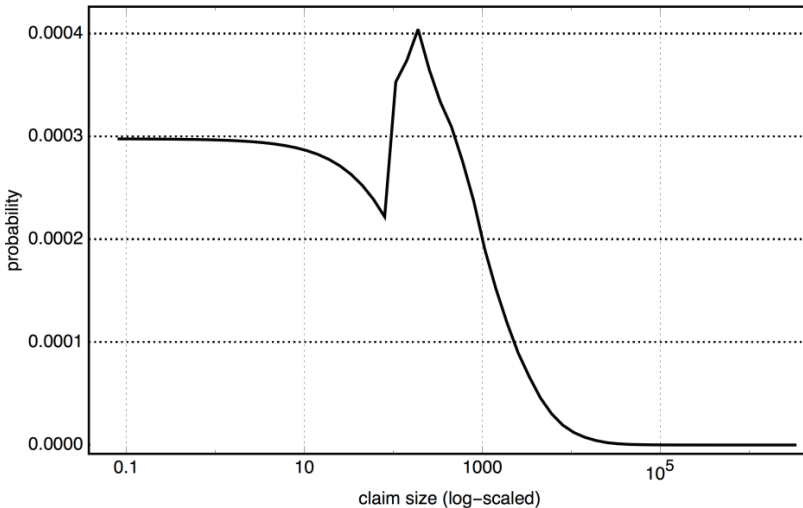
85. It may surprise some to learn that there are many mathematical equations for which there is no “closed form” solution, i.e., a mathematical expression that contains numbers and elementary functions such as trigonometric functions, exponential functions, and basic mathematical operations. There is nothing that one would conventionally call a formula. For good discussions, see Jonathan M. Borwein & Richard E. Crandall, *Closed Forms: What They Are and Why We Care*, 60 NOTICES AM. MATHEMATICAL SOC’Y 50 (2013); Maxwell Rosenlicht, *Integration in Finite Terms*, 79 AM. MATHEMATICAL MONTHLY 963 (1972). For a recitation of the traditional wisdom, see THE INDIGO GIRLS, LEAST COMPLICATED (Epic Records 1994) (“Some long ago when we were taught [t]hat for whatever kind of puzzle you got [y]ou just stick the right formula in.”).

86. J.A. Nelder & R. Mead, *A Simplex Method for Function Minimization*, 7 COMPUTER J. 308 (1965).

87. This is the method that was in fact employed on this project. I found that it worked better and faster than seemingly more direct alternatives such as Newton’s method for finding the roots of a mathematical expression.

below shows the “probability density function” of that distribution.⁸⁸ With a little calculus, we can compute the expected value of claims. This is the amount an insurer would need to charge (absent loading charges) in order to break even if it in fact faced such a population and there were no reinsurance. And in fact, for the Gold 2016 group, that number is \$5,666. If the loading factor—the amount for overhead, nonclaims expenses, and profit—is 17.7%, which corresponds to the permitted 85% Medical Loss Ratio required by other parts of the ACA,⁸⁹ this means the breakeven premium would need to be \$6,666.

Figure 12
PROBABILITY DENSITY FUNCTION FOR GOLD CLAIMS IN 2016



Again, with a little calculus, one can also compute the expected amount the reinsurer (here the government) would be expected to pay on such claims for any set of reinsurance parameters: an attachment point, a payment rate, and a claims cap.⁹⁰ The table below

88. The x -axis is log scaled because otherwise the vast majority of claims that are less than \$10,000 are square-inched into a tiny left hand part of the graphic.

89. See 42 U.S.C. § 300gg-18(b) (2010).

90. There is a complication. The continuance tables contained in the Actuarial Value Calculator refer to the amount the insured incurs in covered claims, not to the amount the insurer pays. In fact, however, the insurer pays less than the incurred covered claims because some of the claim is generally paid for by the insured (cost sharing). Therefore, in order to perfectly compute the value of the reinsurance, one would have to know the distribution not of incurred claims but of the amount the insurer paid. That precise information is not available. One can,

shows what that would be for the original 2014 parameters, the revised 2014 parameters,⁹¹ the 2015 original parameters, the 2015 final parameters, and the 2016 parameters. The figure is shown as an absolute amount, as a fraction of expected claims, and as a fraction of expected break-even premium. The way to read this table is to note that for a Silver plan offered in 2014, the absolute value of the Transitional Reinsurance subsidy was \$339.50 (under the original 2014 parameters), \$563 under the final 2014 parameters, and \$237.70 under the final 2015 parameters. Or for a Gold plan offered in 2016, the absolute value of the Transitional Reinsurance subsidy would have been \$443.60 under the original 2014 parameters but just \$170.40 under the 2016 parameters.

however, estimate the amount the insurer paid on relevant claims by subtracting from each claim the maximum out of pocket limit for the applicable policy for that year and then clipping the difference so that it is never negative. To compute the maximum out of pocket limit, the QHP Landscape Individual Market files were retrieved from data.healthcare.gov for 2014, 2015, and 2016. For each metal level, the mean medical maximum out of pocket limit was computed. Since this method is imperfect, I tested to see how much it mattered. It is fair to say that small errors in the estimate of the maximum out of pocket limit would not substantially affect the conclusions of this Article.

91. The Obama administration revised its original plans for reinsurance for both 2014 and 2015. In 2014, it ultimately lowered the attachment point from \$60,000 to \$45,000 and increased the payment rate to 100%. In 2015, it ultimately lowered the attachment point from \$70,000 to \$45,000. *See* Chandler, *supra* note 74 (arguing that these reductions were illegal insofar as they resulted in the United States Treasury not receiving certain funds that the ACA had promised to it).

Figure 13

	2014_Original	2014_Final	2015_Original	2015_Final	2016_Original	
Bronze	2014	286.85	475.33	151.42	237.67	110.88
	2015	286.26	474.17	151.13	237.08	110.70
	2016	355.50	586.35	188.29	293.17	138.70
	2017	441.08	741.33	231.22	370.67	168.33
	2 levels 4 rows					
Silver	2014	339.49	563.78	178.92	281.89	130.56
	2015	340.47	565.70	179.39	282.85	130.87
	2016	425.54	702.83	225.19	351.41	165.63
	2017	525.47	882.29	275.59	441.14	200.71
	2 levels 4 rows					
Gold	2014	354.83	594.21	186.13	297.11	134.88
	2015	357.21	598.92	187.25	299.46	135.59
	2016	443.62	738.25	233.50	369.13	170.44
	2017	537.94	905.57	281.30	452.78	203.61
	2 levels 4 rows					
Platinum	2014	406.87	700.68	210.79	350.34	150.79
	2015	411.13	709.60	212.75	354.80	151.97
	2016	516.60	886.05	267.90	443.02	191.91
	2017	606.64	1044.90	313.54	522.46	223.33
	2 levels 4 rows					
1 level 4 elements						

We can view the same information not as an absolute amount but as a percentage of expected premiums. These figures thus tell us the amount that the Transitional Reinsurance reduced the breakeven premium for the hypothetical populations referenced in the Actuarial Value Calculator. We read the table the same way. Because of the Transitional Reinsurance finally implemented in 2014, a Bronze plan in 2014 ultimately had (for the hypothetical population) a break-even premium about 10% lower than it otherwise would have had. A Bronze plan in 2015 had a break-even premium that was different by 5% than it would have had if no Transitional Reinsurance existed. And a Bronze plan in 2016 will, if the reinsurance parameters do not change, have a break-even premium that is different by 3% than it would have if no Transitional Reinsurance existed.

Figure 14

Bronze		2014_Original	2014_Final	2015_Original	2015_Final	2016_Original
	2014	0.06	0.10	0.03	0.05	0.02
	2015	0.06	0.10	0.03	0.05	0.02
	2016	0.07	0.11	0.03	0.05	0.03
	2017	0.08	0.13	0.04	0.06	0.03
	2 levels 4 rows					
Silver		2014_Original	2014_Final	2015_Original	2015_Final	2016_Original
	2014	0.06	0.10	0.03	0.05	0.02
	2015	0.06	0.10	0.03	0.05	0.02
	2016	0.07	0.11	0.04	0.06	0.03
	2017	0.08	0.13	0.04	0.07	0.03
	2 levels 4 rows					
Gold		2014_Original	2014_Final	2015_Original	2015_Final	2016_Original
	2014	0.06	0.10	0.03	0.05	0.02
	2015	0.06	0.10	0.03	0.05	0.02
	2016	0.07	0.11	0.04	0.06	0.03
	2017	0.08	0.13	0.04	0.06	0.03
	2 levels 4 rows					
Platinum		2014_Original	2014_Final	2015_Original	2015_Final	2016_Original
	2014	0.06	0.10	0.03	0.05	0.02
	2015	0.06	0.10	0.03	0.05	0.02
	2016	0.06	0.11	0.03	0.05	0.02
	2017	0.07	0.12	0.04	0.06	0.03
	2 levels 4 rows					
1 level 4 elements						

So, we can now reach a major conclusion. Assuming the data within the Actuarial Value Calculator was actually correct, the phase out of Transitional Reinsurance likely played some role in the premium increases seen between 2015 and 2016; it was very unlikely, however, to have been the dominant factor. Going from a 5% subsidy to a 3% subsidy for Bronze, Silver, and Gold, and from a 5% subsidy to a 2% subsidy for Platinum simply cannot explain premium increases in excess of 10%. There clearly was much more going on.

And going forward, will the likely elimination of Transitional Reinsurance in 2017 make a big difference? My computations suggest that it will make a small difference only. Were the 2016 levels of reinsurance to remain in place in 2017, gross premiums would likely be about 3% lower for most plans. While that is not a trivial amount, neither is it likely determinative in the stability of the ACA.

CONCLUSION

The Actuarial Value Calculator created pursuant to the Affordable Care Act may be a harbinger in the use of computation in regulation. It provides a government created tool under which private parties determine whether their product complies with federal regulatory norms and then provides a signal that communicates the output of the calculator to the consumer. In theory, there is much to be said for the use of complex calculators. The decision to use a calculator permits government to engage in more sophisticated regulation of financial products and probably physical products as well. Constraints on public and private behaviors can better match the complex facts of the domain in which the calculator operates. It creates somewhat of an even playing field for competitors in understanding the regulatory requirements. If done right, it also makes regulation more transparent by letting regulated entities and at least a few members of the interested public see, at a far more precise level of detail, exactly how the regulations operate. As we have seen, formulation of the Calculator can also liberate data that can be repurposed to consider the effect of other regulations—here the otherwise somewhat inscrutable Transitional Reinsurance program.

There are burdens that come with greater use of Calculators, however. These burdens were not well met thus far with the Actuarial Value Calculator. To satisfy administrative law precepts, the computations must be truly open, as should the data that underlies the computations. Code should meet standards in the computer industry for clarity, commenting, and modularity. Computations should be falsifiable through use of automated testing; hand testing of a few cases on objects as complex as the Actuarial Value Calculator are likely to be insufficient. This means that the Calculators should be created in a way such that they can be called as a function from other programs and debugged with automated assistance as with other programs. There must be ways for users to provide timely and effective feedback when they determine that the code is having unintended results or when they determine, as is the case with the Actuarial Value Calculator, that the description of the data does not match what is actually provided. In short, since the Calculator effectively acts as law, it should be treated as law.

Finally, the Actuarial Value Calculator sheds light on the Transitional Reinsurance program under the ACA. The claims distributions implicitly embedded in the data segments of the

Calculator coupled with the use of some basic calculus shows that Transitional Reinsurance has been very helpful to insurers and has, in competitive markets, helped keep prices for exchange policies lower than they would be otherwise. But if we see continuing increases on the order of 8% to 10% per year for gross premiums on the Exchanges or for particular subsets of policies, such as Gold and Platinum policies or high choice policies such as Preferred Provider Organizations, it is difficult to see how the phase out of Transitional Reinsurance could be responsible. Other, and potentially more troubling, forces are at work.



Michigan State
Law Review