



# Measuring efficiency of health plan payment systems in managed competition health insurance markets



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## ARTICLE INFO

### Keywords:

Health insurance  
Adverse selection  
Risk adjustment

## ABSTRACT

Adverse selection in health insurance markets leads to two types of inefficiency. On the demand side, adverse selection leads to plan price distortions resulting in inefficient sorting of consumers across health plans. On the supply side, adverse selection creates incentives for plans to inefficiently distort benefits to attract profitable enrollees. Reinsurance, risk adjustment, and premium categories address these problems. Building on prior research on health plan payment system evaluation, we develop measures of the efficiency consequences of price and benefit distortions under a given payment system. Our measures are based on explicit economic models of insurer behavior under adverse selection, incorporate multiple features of plan payment systems, and can be calculated prior to observing actual insurer and consumer behavior. We illustrate the use of these measures with data from a simulated market for individual health insurance.

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## 1. Introduction

As is well-known, individual health insurance markets are vulnerable to adverse selection, the tendency of sicker, higher-cost consumers to choose more generous coverage. This natural pattern of demand causes two forms of economic inefficiency: 1) equilibrium premiums reflect selection as well as coverage differences, leading to price distortions that cause consumers to choose the “wrong” plans (Einav and Finkelstein, 2011), and 2) insurers distort the coverage of their health plans to make them less attractive to unprofitable (typically sicker) enrollees (Glazer and McGuire, 2000; Geruso and Layton, 2017). The relative importance of these two inefficiencies varies across markets. In the U.S. Medicare program, sorting beneficiaries between the private managed care plans (Medicare Advantage plans) and traditional Medicare is the main efficiency and policy issue (Curto et al., 2014), whereas in the national health insurance system in the Netherlands with common regulation and coverage for the entire population, underprovision of some services (e.g. exclusion of high-quality doctors or health care facilities from provider networks) is the main concern (van Kleef et al., 2013). Other markets, such as the Marketplaces

established in the U.S. as part of the Affordable Care Act (ACA) feature both concerns: inducing participation among those eligible to purchase coverage on the Marketplace (Newhouse, 2017) and ensuring that the plans provide adequate coverage for all conditions (Geruso et al., 2016). Economic analysis contends with both forms of selection-related inefficiencies by *ex ante* study of the incentives embedded in insurance markets under alternative policy environments<sup>1</sup> and by *ex post* evaluation of the performance of implemented policies based on actual consumer and insurer behavior.<sup>2</sup>

This paper develops and implements a general methodology for assessing the *ex ante* selection-related inefficiencies created by a health plan payment system in regulated individual health insurance markets. Our perspective is at the market design phase: with data on patterns of utilization representative of the population to be covered, we want to develop an approach to assessing how well a payment system – meaning the set of policies regulating both the

<sup>1</sup> An example we discuss later is the *ex ante* evaluation of the risk adjustment system used to pay plans in the new Marketplaces by federal contractors (Kautter et al., 2014).

<sup>2</sup> See Ericson and Starc (2012) for an early evaluation of insurance pricing in the precursor to national reform in Massachusetts, and Kowalski (2014) for an evaluation of selection inefficiencies in plan choice in state health care reforms. We discuss a number of these *ex post* evaluation studies below.

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premium structure and the plan payment scheme – will contend with the two selection-related inefficiencies. Although *ex post* evaluation is obviously necessary and important, *ex ante* analysis and simulations are the primary way regulators evaluate and decide on payment systems for the new Marketplaces, Medicare's payment system for private health plans, and plan payment systems in the Netherlands, Switzerland, Israel and Germany.<sup>3</sup> We believe the methodology of *ex ante* evaluation can be improved over the current state of the art. For many years, studies in this literature have focused on the R-squared of a regression of actual costs on the predicted costs output by the risk adjustment formula. Some papers in this literature also include ratio or difference measures of over/under compensation. In the U.S., “predictive ratios,” the ratio of predicted costs to actual costs for selected groups in the population, such as those with a chronic illness, are used, whereas in Europe researchers study over- and undercompensation – the difference between projected revenues and costs rather than their ratio. Although widely used, neither an R-squared nor a predictive ratio has been shown to have a direct interpretation in terms of economic efficiency.

In this paper we derive measures for *ex ante* evaluation of payment system performance in terms of economic efficiency, requiring three things from the measures we propose: First, they should be *valid*, *i.e.*, the measures should follow from formal analysis of the economic behavior causing the selection problems the payment system is designed to correct. Specifically, they should be based on the effects of a payment system on consumer welfare rather than just the (individual- or group-level) discrepancy between plan revenues and expected costs. Second, measures should be *complete* in the sense of accommodating all relevant features of payment systems used to pay health plans including multiple premium categories and reinsurance, not just the risk adjustment formula. Third, the measures should be *practical*, that is, readily computable from the large claims databases available at the design phase for *ex ante* evaluation of payment system alternatives.

While the standard measure used for *ex ante* analysis of payment system performance, the R-squared from a regression of costs on risk adjustor variables, is both practical (requirement 3) and allows for the comparison of payment system performance, it does not accommodate the complete set of payment system features (requirement 2), nor has it been shown to measure any parameter of *economic* importance (requirement 1). The same could be said of ratio or difference measures of over/undercompensation. Other more economically valid welfare metrics, require estimates of key behavioral parameters among the population of interest, causing them to be impractical for *ex ante* policy analysis.<sup>4</sup> In a nutshell, our paper intends to equip researchers and regulators with a methodology, or a “toolkit,” for evaluating payment system alternatives in terms of economic efficiency rather than statistical fit which has dominated this literature for more than 30 years.

Our focus is on selection-related efficiency problems associated with both inefficient plan choice and inefficient plan design. In each case, we start with an economic description of the behaviors associated with adverse selection, and derive a measure (or measures) of efficiency loss due to the incentive problems. With respect to inefficient plan choice, we show that two measures, which we call “premium fit” and “payment system fit,” are needed to characterize the magnitude of the efficiency loss. Premium fit

measures how well premium categories explain the variation in spending in the population, while payment system fit measures how well simulated plan revenues for an individual, which are a function of payment system features such as premium variation, risk adjustment, and reinsurance, match that individual's total cost to the insurer. We show that premium fit is important independent of payment system fit due to the insight that even if a payment system perfectly matches revenues to costs at an individual level, inefficiency will remain because, except in a very special case, no single premium sorts consumers efficiently among plans. This links our analysis to papers by Bundorf et al. (2012), Geruso (2017), and others.

With respect to the second selection-related problem, existing service-by-service incentive measures based on predictability and predictiveness of each service do not produce an overall metric for efficiency (Ellis and McGuire, 2007). We generalize the service-by-service approach, and present a new cardinal measure that summarizes overall welfare loss developed in Layton et al. (2016a,b). This new metric can also be computed using the large administrative health insurance claims databases typically used for *ex ante* payment system evaluation.

We illustrate the use of our measures for the evaluation of the performance of the payment system being implemented in the ACA Marketplaces starting in 2017 (ACA 2017) relative to an alternative system. This policy remains a relevant baseline even if U.S. health policy moves away from this approach. Under ACA 2017, premiums are set by a pre-specified age curve, risk adjustment is concurrent (*i.e.* based on diagnoses from the current year rather than the prior year) and mandatory federal reinsurance is eliminated. We evaluate the plan against an alternative which keeps the existing age curve and reinstates reinsurance, but that switches to prospective risk adjustment (*i.e.* based on diagnoses from the prior year) rather than concurrent risk adjustment. Our comparison illustrates how our selection metrics work, and also provides relevant evidence for policy choices going forward for the Marketplaces.

We acknowledge that regulators have objectives in addition to reducing inefficiencies from adverse selection, including incentives for cost control, avoiding gameability, and fairness. Among the papers that consider these issues are Handel et al. (2015a) who study the tradeoff between inefficient plan choice and “reclassification risk,” Beck et al. (2014) who consider the tradeoff between fairness and selection incentives, and Geruso and McGuire (2016) who evaluate a tradeoff between selection inefficiencies and incentives for cost control. We return in a final section to discuss other dimensions of comprehensive *ex ante* plan payment evaluation.

The remainder of the paper proceeds as follows: Section 2 reviews and critiques existing methods for assessing payment systems and measuring selection inefficiency and flags the gaps in the literature that we seek to fill. We next present theoretically grounded and practical measures related to inefficiency in consumer choice of plan (Section 3) and in insurer choice of health plan design (Section 4). We illustrate how our measures work in Section 5. We summarize and discuss the findings in Section 6.

## 2. Assessing adverse selection in health insurance markets

The literature assessing inefficiencies related to adverse selection falls into three groups. The first and largest group contains papers applying statistical measures to assess payment systems. Papers in the second and third groups apply measures based on the economics of consumer and plan behavior, respectively.

<sup>3</sup> See as examples, Kautter et al. (2014) on US Marketplaces; Pope et al. (2011) on US Medicare; Shmueli et al. (2010) on Israel; Beck et al. (2010) on Switzerland; Breyer et al. (2003) on Germany; van Kleef et al. (2013) on the Netherlands.

<sup>4</sup> For example, the certainty-equivalent measure used by Einav et al. (2010a,b) requires estimates of risk aversion which are difficult to estimate from health insurance choices.

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