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Do Health Insurers Manage Their Medical Loss Ratios? At What Cost?

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Do Health Insurers Manage their Medical Loss Ratios - and at what Cost?

Elizabeth Plummer, Ph.D. | William F. Wempe, Ph.D.

IMPORTANCE The Affordable Care Act's Medical Loss Ratio (MLR) provisions require health insurers to pay specified percentages of premiums as claims or else pay rebates to policyholders. From 2012-2019, insurers paid $6.9 billion in such rebates. Insurers can reduce or eliminate rebates by over-estimating year-end outstanding claims, but they do so at the cost of reporting lower profits. Likewise, insurers with greater-than-required MLRs can underestimate year-end outstanding claims, thereby increasing profits while remaining compliant with the MLR provisions.

OBJECTIVES To examine how the MLR provisions and health plans' incentives to earn acceptable profits influence plan managers' upward and downward discretion in estimating yearend outstanding claims.

EVIDENCE We analyze data from health insurers' MLR reports filed with the Centers for Medicare and Medicaid Services for 2011 through 2015. For each state, insurers file annual MLR reports for each market in which they operate – Individual, Small Group, and Large Group. We estimate managers' discretion in estimating year-end outstanding claims using the claims error for a specific market, measured as the claims estimate for year t reported at the end of year t, minus the revised claims estimate for year t reported at the end of year t+2. We use regression analysis to examine the association of such claims errors with incentives provided by the MLR provisions, the desire to report acceptable plan-level profits, and other variables.

FINDINGS We examine claims errors for 1,951 health plans, or 4,642 plan-year observations over a three-year (2011-2013) period. We find strong evidence that health plans that would otherwise be MLR noncompliant overestimate their year-end outstanding claims, thereby increasing their reported MLRs and reducing (or eliminating) rebate payments to policyholders. We report equally strong evidence that health plans with greater-than-required MLRs underestimate year-end outstanding claims, thereby increasing plan earnings while remaining MLR compliant. We also find evidence that plans which would otherwise report small negative earnings underestimate year-end outstanding claims in order to report positive plan-level profits. Results generally hold for the for-profit and non-profit subsamples as well as across markets, although some results are modestly stronger in the for-profit sample and modestly weaker in the Individual market. Additional analyses suggest that claims overstatements in 2011-2013 reduced insurers' rebate payments by $190 million to $325 million (10%-17% of rebates actually paid), and that claims understatements totaled 14% to 34% of health plans' pre-tax profits.

CONCLUSION & RELEVANCE Our study provides evidence that health insurers exercise both upward and downward discretion in year-end estimates of outstanding claims in response to incentives provided by the MLR provisions and the desire to report acceptable plan profits. Upward discretion in estimates of outstanding claims reduces the rebates that policyholders would otherwise receive, while downward discretion increases the profits that insurers report to regulators, investors, and other stakeholders. Policymakers and regulators should continue to monitor such discretion in insurers' claims estimates and consider whether some aspects of the MLR provisions should be modified to mitigate the substantial flexibility that insurers enjoy in managing their reported MLRs.

Do Health Insurers Manage Their Medical Loss Ratios? At What Cost?

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Abstract

We use plan-level data to examine a reporting incentive unique to health insurers—the federal Affordable Care Act's (ACA's) Medical Loss Ratio (MLR) provisions—which require that health plans spend a specified percentage of premiums on claims or else pay policyholder rebates. While there are no penalties for noncompliance with the MLR provisions, incentives for insurers to comply include avoiding political and reputation costs, reducing administrative burdens, and eliminating rebate payments. We find that health plans with pre-managed MLRs—i.e., the MLRs that would be reported without reporting discretion—below the required MLR overstate claims, thereby increasing their MLRs and reducing or eliminating rebate payments. Overall, results suggest that overstating claims reduced rebate payments by approximately $190 million to $325 million for 2011–2013; i.e., about 10–17% of total rebates actually paid. We also find that plans with pre-managed MLRs significantly greater than the minimum required MLR understate claims, thereby improving plan earnings while still complying with the MLR provisions. These understatements average between 14–34% of plans' pre-tax earnings.

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1. Introduction

The ACA requires that health insurance plans spend a specified percentage of premiums on claims or else pay cash rebates to policyholders. If health plan managers can overstate current-year claims estimates via year-end accruals, it is possible to reduce or eliminate these cash rebates with no effect on future years' claims or claims estimates. In this study, we use a unique dataset for health insurers that provides for a relatively direct measure of health plan managers' discretion—i.e., over- or understatement—in reporting current-year claims estimates. Our examination of health plan managers' reporting discretion in response to the ACA's unambiguous plan-level regulatory target represents an unusually powerful test of managers' responses to reporting incentives.

The ACA's MLR provisions require Individual and Small Group health insurance plans to spend at least 80% of premium revenues on qualified health care costs (primarily claims), thereby limiting the percentage that can be spent on administrative costs or perquisites or retained as profits. The required spending is 85% for Large Group plans.[1] These percentages are based on a rolling three-year average. Noncompliant plans must disclose their noncompliance (publicly via websites and privately via letters to policyholders) and pay rebates to policyholders by Aug. 1 of the subsequent year (ACA, Section 2718). Rebate payments merely adjust (ex post) a noncompliant plan's MLR to the minimum percentage required under the provisions. No additional penalties, interest or other costs are imposed.[2] Thus, while the MLR provisions provide health plan managers with an explicitly defined regulatory target, the dearth of penalties or sanctions associated with noncompliance may mute managers' responses to the target if management's actions to avoid rebates are costly (e.g., increasing claims actually paid).

However, the manner in which the MLR and rebates are calculated provides plan managers with low-cost opportunities to overstate claims and either achieve compliance—i.e., meet the minimum MLR—or reduce the rebate amount resulting from noncompliance.[3] No penalties or sanctions are imposed on plans that initially overestimated claims for a particular year, nor is there any requirement to revise the

1. Individual plans are not employer-sponsored. Small Group and Large Group plans are employer-sponsored. Large Group plans require more than 50 covered employees in some states and more than 100 in other states.

2. Suppose a Large Group plan, which has a minimum MLR requirement of 85%, has premiums of $1 million and claims of $830,000. The plan's MLR is 83%, and the plan will be required to pay a $20,000 rebate to policyholders. Thus, the $20,000 rebate merely revises the plan's MLR (ex post) to 85%; no additional (explicit) costs or penalties result from not initially meeting the 85% requirement. As discussed later, this simple example ignores the fact that, beginning in 2013, health plans' MLRs are calculated as three-year rolling averages. The MLR provisions also allow adjustments for other amounts (e.g., quality improvement costs), but these amounts are very modest relative to claims and premiums.

3. Holding premiums constant, plans achieve MLR compliance (ex ante or ex post) by: 1) paying claims in cash; 2) paying rebates in cash; or 3) overestimating claims at year-end, which requires no cash. Option 3 is the least costly means of achieving MLR compliance.

rebate payment when the original claims estimate ultimately proves to be too high. Importantly, under the MLR provisions, a claim is inextricably tied to the year in which it is incurred; i.e., generally the date the policyholder receives health services or prescription drugs. Thus, for purposes of calculating the MLR, overestimating claims for one year has no effect on future years' claims or claims estimates. This is distinctly different from company-level, accrual-based earnings management where overstating earnings in one year generally results in lower earnings in a future year; i.e., the managed amount reverses.

While managers can overstate claims estimates to reduce rebates, there are at least four factors that limit their ability to do so. First, health plans' MLR reports are subject to review by auditors, actuaries, and state insurance regulators (Gaver and Paterson, 2001).[4] Second, a significant portion of health insurance claims are typically settled within one year (FASB, 2015), and managers have less discretion over reserves as the settlement period shortens (Gaver and Paterson, 2004). Third, overstating claims decreases a plan's current-year net income; i.e., premiums minus claims minus non-claims costs, including agents and brokers fees and commissions, as well as other general and administrative expenses. Hence, plan managers who overstate claims must weigh the cost of reporting lower current-year plan-level net income against the benefit of paying lower rebates in the following year. Finally, health plan managers may lack the autonomy or authority necessary to respond to plan-level regulatory or earnings incentives, especially if such incentives differ from those that exist at the company level and are of greater concern to upper-level management.

To examine health plan managers' reporting discretion in response to the MLR provisions, we analyze data obtained from health insurers' MLR Annual Reporting Forms filed with the federal Centers for Medicare and Medicaid Services (CMS) for 2011 through 2015. Insurers file an MLR report annually for each state in which they operate, and the form reports premiums, claims, and other financial and non-financial information separately for each market in which an insurer conducts business; i.e., Individual, Small Group and Large Group. We estimate managers' reporting discretion using the claims error for a specific market, measured as the claims estimate for year t reported at the end of year t, minus the revised claims estimate for year t reported at the end of year t+2. Hence, we use the revised claims estimate as our proxy for a plan manager's unbiased expectation of year t claims. A positive claims error suggests that a manager initially overstated claims for year t; a negative error suggests that claims were initially understated.

4. The federal Center for Consumer Information and Insurance Oversight (CCIIO) has oversight responsibilities related to many ACA provisions, including detailed audits of health plans' MLRs. However, the MLR examination program did not commence until 2015, with review of data reported for the 2013 reporting year. To date (December 2020), the CCIIO appears to have conducted only 24 such audits. This low incidence of auditing suggests that state insurance regulators' impact on health plan managers' claims estimates may be quite limited. With respect to audits of firms' financial statements, external auditors do not have the same auditing obligations or focus at the plan level. See *https://www.cms.gov/CCIIO/Programs-and-Initiatives/Health-Insurance-Market- Reforms/MLR_examinations_reports*.

Our sample includes nearly 2,000 health plans in all three markets and more than 4,500 plan years for 2011–2013. The sample includes plans from all 50 states and consists of approximately 80% for-profit (FP) and 20% not-for-profit (NFP) plan years. Our primary goal is to examine the association between a manager's plan-level claims error—i.e., our proxy for reporting discretion—and the plan's compliance status based on its pre-managed MLR, where a pre-managed MLR is what the plan's MLR would have been had the manager reported an unbiased estimate for year t claims. We refer to plans with pre-managed MLRs less than the minimum standard as hypothetically noncompliant plans. In regression tests, we control for plan earnings, plan size and other variables.

Despite the impediments to overstating claims, we report strong evidence that health plan managers exercise MLR-related discretion when estimating claims. Results indicate that hypothetically noncompliant plans overstate claims to affect increases in their reported MLRs and achieve reductions in their cash rebate payments. These results for claims overstatements hold for both FP and NFP insurers as well as plans in the Small Group and Large Group markets. Separate analysis of the Individual market suggests that hypothetically noncompliant plans overstate claims, but not significantly so.

While there are clear incentives to increase a plan's MLR to reduce or eliminate cash rebate payments, health plans and plan managers garner little-to-no benefit from reporting MLRs that exceed the minimum requirement. Therefore, it seems likely that managers of plans with pre-managed MLRs that substantially exceed minimum requirements might exercise downward discretion in claims estimates, thereby reducing reported MLRs (to levels that nonetheless remain compliant) while simultaneously increasing plan earnings. Results from both univariate and regression tests strongly support this prediction for both FP and NFP plans as well as plans in all three markets. Taken together, our study's results for both hypothetically noncompliant and compliant health plans suggest that health plan managers carefully evaluate and respond to plan-level incentives when making year-end claims estimates.

Finally, regression results support an unhypothesized association not arising from MLR- related incentives. Our main results consistently suggest that on average, health plans reporting positive income tend to underestimate their claims costs. Moreover, in sensitivity tests designed to more tightly control for plan-level earnings incentives, we find that plans with pre-managed earnings modestly below zero significantly underestimate claims, relative to the claims estimates of plans with either positive or very poor pre-managed earnings. These results hold for both FP and NFP insurers (although the effect is stronger for FP insurers), suggesting that in addition to MLR-related incentives, plan managers respond in predictable ways to plan-level earnings incentives.

Our study makes several contributions to health care policymaking and the insurance and accounting literatures. We show that the MLR provisions induce significant reporting discretion on the part of health plan managers. Our results suggest that managers overstate claims to increase their plans' MLRs and reduce rebate payments. We use these results to quantify the economic effects of these

overstatements. For all plans combined, estimates suggest that overstating claims reduced rebate payments by $190 to $325 million for 2011–2013; i.e., about 10–17% of the $1.9 billion of rebates actually paid over the three years. Thus, our evidence strongly suggests that plan managers' discretionary reporting behavior materially reduced rebate payments. The manner in which MLRs are calculated clearly allows plan managers such discretion. Health care policymakers may wish to reconsider this feature of the MLR provisions. We also show that managers understate claims when a plan has a substantial MLR cushion. Such understatements materially increase plan earnings while typically maintaining compliance with the MLR provisions. Overall, our evidence that health plan managers both understate and overstate claims in response to plan-level MLR and earnings incentives provides important evidence that informs policymakers on the effects of recent health care legislation.

We also contribute to recent studies that examine how health-related regulatory policies affect managerial decisions. Barnes and Harp (2018) find that Medicare statutory formulas influence bed capacity planning policies in urban hospitals, while Belina et al. (2019) examine whether the new MLR provisions affected the stickiness of selling, general and administrative (SG&A) costs for publicly traded health insurers. They provide evidence that SG&A cost stickiness declined in the post-ACA period and conclude that the MLR provisions encourage managers to exhibit more cost cutting behavior in revenue decreasing periods. Eastman, Eckles and Van Buskirk (2020) provide evidence that insurers overstate claims to increase their MLRs and reduce rebate payments, but they do not explore claims understatements or the effects of plan-level earnings incentives on claims estimates. Plummer and Wempe (2016) provide evidence on how the ACA provisions related to physician-owned hospitals affected the hospitals' formation, ownership and capacity and led them to increase their use of assets and employees. Collectively, papers that examine operational responses to health care policies, along with studies of health care policy-driven reporting discretion, demonstrate that the health care setting provides researchers with rich opportunities to investigate how regulatory policies affect managerial decisions.

We examine a high-profile setting in which the costs of missing a regulatory target include indirect costs (e.g., political and reputation costs, administrative costs), as well as direct cash outlays for policyholder rebates. Political and reputation costs are particularly salient in health care settings, which have been the subject of increased media, congressional and consumer attention. Avoiding such costs, while simultaneously reducing cash rebate payments, provides powerful incentives for managers of noncompliant plans to overestimate claims via year-end accruals.

We exploit a new dataset that results from health insurers' ACA reporting requirements. Prior studies have examined property/casualty (P/C) insurers using firms' NAIC filings, which combine a company's financial results across all states and insurance markets in which the company does business. In contrast, we measure claims errors separately for each state and market in which an insurer does business using the actual MLR reports that health insurers file with the CMS. These plan-

level data significantly decrease the degree of estimation required, thereby allowing for more powerful tests of management's reporting discretion and increasing the validity of our measures and reported inferences. Moreover, the MLR provisions provide a single, bright-line target for health plan managers deciding how much reporting discretion to exercise. This bright-line target differs markedly from earnings benchmarks, for which ambiguity exists regarding the earnings number being targeted, or financial strength ratios, which generally include multiple accounting-based targets.

Finally, it is important to recognize the uniqueness of our study's unit-of-analysis—health plans. Beuselinck et al. (2019) note that the "vast majority of prior earnings management studies focus almost exclusively on consolidated financial statements." Bonacchi et al. (2018) likewise describe "almost all" of an extensive earnings management literature as having such a focus. Our study, in an insurance context, responds to Prencipe's (2012) interest in whether subsidiaries—which, like health plans, are down-the-line entities—have the discretion and incentive to manage earnings or whether earnings management is orchestrated by subsidiaries' parent companies. Prior research on insurers' management of loss reserves has largely ignored health insurers and focused exclusively on P/C companies using their NAIC filings. However, NAIC-level companies are an aggregation of lower-level entities that can operate in different states and various lines of business, each having their own earnings- and regulatory-related reporting incentives. The insurance literature's prior focus on P/C companies is understandable, given the long-time availability of NAIC data and the relatively long settlement periods of P/C claims—five years or more—that provide managers with ample opportunities for reporting discretion (Gaver and Paterson, 2004). In contrast, the clean lines around our plan-level data and the bright-line nature of the MLR target allow for powerful tests in a setting with substantial impediments to earnings management; i.e., significantly shorter settlement periods, more defined insurance coverages, and uncertainty around the authority of plan-level managers to exercise reporting discretion (Gamage et al., 2007; Chadick et al., 2009). We demonstrate that despite these impediments to plan-level earnings management, plan managers nevertheless exercise considerable reporting discretion in response to their incentives.[5]

The next section provides background information, reviews prior literature, and develops our two hypotheses. Section 3 describes the sample selection and reports

5. Given its shorter settlement periods, health insurance is said to be a "shorter-tailed" line than P/C insurance. Gaver and Paterson (2004) note that managers have less discretion over reserves in short-tailed lines. To summarize the key differences in our study compared to P/C studies, we expect that the health insurance setting's relatively short settlement periods, well-defined coverages, and detailed reporting requirements allow us to measure plan managers' reporting discretion with less measurement error compared to the measurement error in P/C studies. This lower measurement error and the MLR provision's bright-line target increase the power of our tests. At the same time, short settlement periods, well-defined coverages, and uncertain plan-level authority reduce the likelihood that health plan managers are actually able to exercise discretion in estimating claims.

descriptive statistics. Section 4 explains our empirical design, and Section 5 provides results. Section 6 summarizes and concludes the paper.

2. Background and Hypotheses

2.1 MLRs under the ACA: Legal Requirements and Managers' Incentives

The federal MLR provisions were effective beginning Jan. 1, 2011 (ACA, Section 2718). Prior to the ACA, many states used an MLR measure in the rate-approval process, with MLR generally defined as the ratio of claims to premiums.[6] The ACA's measure is similar, but it also allows for adjustments to both the numerator and the denominator:

$$MLR = \frac{\text{CLAIMS} + \text{Costs for Activities that Improve Health Care Quality}}{\text{PREMIUMS} - \text{Taxes, Licensing and Regulatory Fees}}$$

Noncompliant plans—i.e., Individual or Small Group plans with MLRs below 80%; Large Group plans with MLRs below 85%—must publicly disclose their noncompliance and pay rebates to enrollees.[7] MLR proponents argue that the provisions will help reduce the cost of insurance because they encourage insurers to control salaries, perquisites and profits. However, some evidence suggests that, on average, low MLRs were not a significant problem prior to the ACA. For example, Harrington (2013) examines pre-ACA MLRs and finds that MLRs have averaged 87.7% since 1965, and insurers' profit margins have run in the 3–5% range.

6. State-mandated MLRs varied and were generally lower than the ACA's MLRs (Harrington, 2013).

7. We focus solely on the claims component of the MLR measure for several reasons. Premiums are not a good candidate for reporting discretion because insurers file proposed premium rates for year t with state insurance regulators in the spring of year t-1, and rates are finalized prior to open enrollment periods in the fall of year t-1. Of the remaining MLR components, claims is by far the largest (80–85% of premiums, on average) compared with quality improvement costs (QIC) (less than 1%) and taxes and fees (about 3%). It is possible that managers could manage QIC and taxes and fees for MLR purposes. However, QIC and taxes and fees are not routinely revised after year t, and management of these costs likely occurs *across* the different markets in a particular state (Individual, Small Group, Large Group, government, uninsured plans, and other health business) and/or across the different states in which the NAIC company operates. Accordingly, reporting decisions in this context likely occur at a higher level than the plan level. In sum, we focus on claims management because: 1) aside from premiums, claims are by far the largest component of the MLR; 2) our analysis is concerned with MLR management occurring at the plan level; and 3) measuring the claims error does not require an estimation model, as would be the case for QIC and taxes and fees, given the absence of post-year t revisions.

Accordingly, opponents argue that the MLR provisions are unnecessary and unduly burdensome.

The MLR is computed at the plan level. For example, an insurer would compute the MLR for its Large Group plans collectively in California. If this MLR was below 85%, the plans would be noncompliant and pay rebates to their policyholders. As a technical matter, a noncompliant MLR simply indicates that, under the law, claims were too low relative to premiums. Practically, however, noncompliant plans may be viewed as having profits or administrative costs that are too high or characterized as under-delivering health care or health insurance value to policyholders.

Notably, no direct regulatory costs result from an insurance plan falling short of its required MLR. There is no government-imposed penalty, since the resulting rebate payments merely true up an insurance plan's claims payments to yield (ex post) an MLR exactly equal to the minimum standard. The lack of direct regulatory costs for noncompliance could provide managers with insufficient incentive to comply (ex ante) with the MLR provisions (Harrington, 2013). However, at least three factors may incentivize plans to meet the MLR standard. First, overestimating claims to achieve MLR compliance, or reduce the extent of noncompliance, is a relatively low-cost managerial undertaking with substantial rewards; i.e., reducing or eliminating cash rebates. Second, Individual plans bear the administrative burden of distributing rebates to policyholders, and Small and Large Group plans must issue rebate payments to employers, who then distribute rebates to employees. Third, insurers may desire to comply with the MLR provisions to avoid political or reputation costs from noncompliance. Political costs can arise if noncompliance increases the likelihood of unwelcome attention from state insurance regulators or the difficulty of obtaining regulatory approval for future rate increases. For example, the ACA requires that all Individual and Small Group insurers seeking rate increases greater than 10% undergo a rate review by state authorities or the U.S. Department of Health and Human Services (HHS), and a plan's past and (predicted) future MLR compliance is a significant consideration in the rate review (CMS, 2015).

The effect of rebate payments on an insurer's reputation is less clear. Noncompliant insurers could incur reputation costs when they publicly disclose their noncompliance and notify their policyholders. Public disclosures are also made by the HHS and states on their respective websites. However, consumer attentiveness to noncompliant MLRs and subsequent rebates is unclear. Moreover, consumers' understanding of what a rebate implies is ambiguous. On the one hand, consumers could interpret rebates as a signal that the premiums paid were too high. Although rebates may alleviate any resulting post-purchase regret on the part of consumers (Dutta et al., 2011), such regret may nevertheless produce negative reputation effects for insurers. Alternatively, consumers may view unexpected rebates as a "pleasant surprise," with this positive view being more likely in markets with high price fluctuations (Dutta et al., 2019).[8] This suggests that policyholders

8. The health insurance market is complex, and product pricing and value are not well-understood by consumers. These conditions could increase the likelihood that policyholders view rebates neutrally or even favorably.

could view rebates favorably, leading to positive reputation effects. In sum, political costs provide managers with incentives to avoid rebate payments, while reputation costs may provide more muted or ambiguous incentives.[9]

Managers' inclination to exercise upward discretion in accrued health claims to reduce or eliminate rebate payments is affected by unique features of the MLR provisions. Under the provisions, a given year's MLR is based on claims and premiums in that year and the two prior years; i.e., annual MLRs are rolling three-year averages.[10] Hence, for a health plan that would otherwise be noncompliant in year t, the claims overestimate required to reduce or eliminate a rebate is a function of more than year t's claims and premiums relative to the required MLR. Assume that a manager overestimates year t claims by $100. If the manager subsequently revises the year t estimate downward by $100 on the plan's MLR reports for year t+1 and/or year t+2, the manager is not required to recalculate the plan's year t MLR or any related year t rebate payments. While the revised year t claims estimate will be reflected in the MLR calculations for year t+1 and year t+2 (because of the three-year averaging), this will not necessarily lead to noncompliance in those years. If year t+1 and year t+2 claims are sufficiently high, then the reduced rebate for year t that resulted from overstating year t claims is a permanent cash savings. Moreover, even if year t+1 or year t+2 claims are not sufficiently high to offset the $100 reversal of year t claims, the health plan derives some benefit from deferring the rebate payment by one or two years.[11]

2.2 Prior Research: Evidence on MLRs under the ACA

For the first year of the MLR provisions (2011), rebates totaled $1.1 billion for all three markets combined. Rebates decreased after this first year, consistent with

9. How consumers regard rebates may be an interesting area for future research. Current estimates suggest that 2020 rebates will increase to nearly $2.5 billion, or $219 per person (Brady, 2020). Moreover, how companies portray such rebates in communicating with consumers (e.g., as "premium discounts" or as evidence of a pro-consumer orientation) may influence any reputation effect related to MLR rebates.

10. The rolling three-year average applies for 2013 and beyond. For 2011, MLRs are based on 2011 data only; 2012 MLRs are based on 2012 and 2011 data. For 2012 and 2013, insurers were generally allowed to add any rebates paid for prior years to the MLR numerator. This is not the case for 2014 and thereafter.

11. Consider a five-year period in which the ACA is fully implemented in years 3, 4 and 5. Assume that premiums in a Large Group plan are $100 each year, and unmanaged claims are $85, $87, $82, $70 and $81. Unmanaged MLRs in years 3, 4 and 5 are 84.7%, 79.7% and 77.7%. For year 3, only $1 of upward claims discretion is required to reach an 85% MLR, given the $2 of excess claims in years 1 and 2. In year 4, $15 of upward claims discretion is required, assuming that the $1 of discretion was exercised in year 3. In year 5, if the manager revises year 3's claims down by $1 and does not revise year 4's claims, then $7 of upward discretion for year 5 is required to reach an 85% MLR. Importantly, the plan is not required to restate the originally reported MLR for year 3 or year 4. In this example, restating the year 3 and year 4 MLRs would result in rebate payments for both years. Because our data source is health plans' actual MLR reports, our study's variable measurement and modeling reflect the relevant details and nuances of the MLR calculation.

managers becoming accustomed to the provisions. However, the amounts continue to be substantial and fluctuate in total and within each market, and they have escalated in recent years. For 2012–2019, aggregate rebates (in millions) across all three markets were: $504; $332; $469; $397; $447; $707; $1,370 and $2,660.[12]

Evidence suggests that MLRs have increased in the post-ACA period. McCue et al. (2013) examine NAIC data and find that MLRs increased (and profit margins decreased) in 2011, although the new provisions' role in the changes is unclear. Abraham et al. (2014) analyze NAIC data for Individual and Small Group plans and conclude that MLRs increased in 2011, with claims increases, rather than premium decreases, being the primary reason.[13] Using 2010–2014 NAIC data, Clemans-Cope and Karpman (2015) conclude that MLR increases in the Individual market exceeded those in the Group markets, with the increase in the Individual market driven predominantly by claims increases. Callaghan et al. (2019) use MLR reports and examine insurers' reported MLRs for two consecutive years (year t and year t+1). They find that insurers with MLRs that are below the required minimum in year t increase their MLRs for year t+1, while plans with MLRs above the minimum in year t decrease their MLRs in year t+1. Additional tests show that plan managers use changes in claims for year t+1, rather than changes in premiums, to induce the MLR increases and decreases. Finally, Cicala et al. (2017) examine 2005–2013 NAIC data and conclude that subsequent year claims increases correspond on an essentially one-to-one basis with the degree to which prior year MLRs fell short of the minimum standard. The authors conclude that, contrary to the original intention of decreasing costs, the MLR provisions have prompted increases in health care expenditures.

In contrast to our study of claims costs and plan-level reporting discretion, Belina et al. (2019) use Compustat data to examine how the MLR provisions affected SG&A cost stickiness for a sample of 22 publicly traded health insurers over the period 2002–2016. They posit that the MLR provisions encourage managers to more closely control SG&A costs, and this behavior will be more pronounced when insurers' revenues decrease. Belina et al. (2019) provide evidence that insurers decreased relative spending on SG&A in the post-ACA period, and there was a significantly larger SG&A decrease when insurers' revenues decreased. Overall, their evidence suggests that post-ACA, the managers of publicly traded health insurers made the sometimes difficult operational choices that are necessary to decrease SG&A spending, thereby reducing cost stickiness.

In a contemporaneous study, Eastman et al. (2020) provide evidence that insurers overestimate claims to avoid rebate payments in the Individual and Large Group markets but not the Small Group market. Our study differs from Eastman et al. (2020) in four important ways. First, Eastman et al. (2020) only examine

12. See CMS reports at *http://www.cms.gov/CCIIO/Resources/Data-Resources/mlr.html*. The 2019 number is a Kaiser Family Foundation (KFF) projection. See *https://www.kff.org/private-insurance/issue-brief/data-note-2020- medical-loss-ratio-rebates*.

13. Abraham et al. (2014) also find statistically significant but very small increases in quality improvement costs in the Individual market. They find no significant increases in quality costs in the Small Group market.

managers' incentives to overstate claims in response to the minimum MLR target, and they do not examine managers' incentives to understate claims and increase plan-level earnings. In our sample, 23% of plans have pre-managed MLRs below the regulatory target, but even more (26%) have pre-managed MLRs far above the target; i.e., an MLR greater than 0.90, or 0.95 for Large Group plans. We show that managers of these latter plans exploit their MLR cushions by underestimating claims, thereby increasing earnings. Second, Eastman et al. (2020) neither test nor control for plan-level earnings incentives, which likely affect health plan managers' year-end reporting discretion We show that such earnings incentives are highly relevant to managers' year-end claims estimates, especially when decreasing claims can help make a plan profitable. Third, Eastman et al. (2020) do not examine FP and NFP plans separately. Our results indicate that this distinction is important, particularly with regard to the salience of plan-level earnings incentives in managers' year-end claims estimates. Fourth, we find that insurers overestimate claims to avoid rebate payments in all three markets, whereas Eastman et al. (2020) find no evidence of this in the Small Group market.[14]

2.3 Hypotheses

As discussed earlier, if a plan's pre-managed MLR is less than the minimum required, managers have incentives to overestimate claims to: 1) reduce or eliminate cash rebate payments; 2) avoid the administrative costs of issuing rebates; and 3) avoid any political or reputation costs of noncompliance. We posit that such incentives apply to both FP and NFP plans. Despite differences in stakeholders, all organizations have incentives to meet operational objectives and continue as going concerns (Vermeer et al., 2014). Moreover, both FP and NFP plan managers have incentives to report performance measures that reflect favorably on their ability to effectively administer their plans' business operations.[15]

Although there are clear incentives for managers to overstate claims, four factors (applicable to both FP and NFP plans) may limit their ability to do so: 1) the boundaries imposed by auditors, actuaries, and state insurance regulators (Gaver and Paterson, 2001, 2007); 2) health claims' relatively short settlement periods that reduce management's ability to strategically manage claims estimates (Gamage et al., 2007; Chadick et al., 2009); 3) overstating claims decreases a plan's net income, indicating that plan managers must trade-off the costs of reporting lower net income against the direct and indirect costs of noncompliance; and 4) health plan managers may lack the authority and/or ability to respond to plan-level regulatory or earnings

14. Eastman et al. (2020) examine one-year claims errors. In our analyses, we examine two-year errors. In our view, two-year errors likely provide a more accurate estimate of managers' reporting discretion.

15. Hoerger (1991) and Leone and Van Horn (2005) provide evidence that nonprofit hospitals use discretionary spending and accruals to manage earnings and meet earnings objectives. Other studies also find that nonprofit managers manipulate financial information in response to incentives (e.g., Yetman, 2001; Keating et al., 2008; Grein and Tate, 2011).

incentives, especially if their incentives differ from those of upper-level company management. Despite these potential impediments, we posit that managers of plans with noncompliant pre- managed MLRs overstate claims. Our first hypothesis is:

H1: Health insurance plans with pre-managed MLRs below their required MLR overstate claims expense to increase their reported MLRs.

In contrast to the costs of MLR noncompliance, FP and NFP health insurance plans (and plan managers) derive no direct benefit from reporting MLRs greater than the required minimum.[16] Thus, when a plan's pre-managed MLR is greater than the minimum required (particularly when it is substantially greater), it seems likely that a manager would underestimate claims, thus increasing plan earnings while remaining MLR compliant. Notably, plans with very high pre-managed MLRs, by definition, have high claims expense relative to premium revenue, and thus are likely to suffer from poor earnings. As with H1, however, management's ability to understate claims may be constrained by external monitoring (e.g., auditors, actuaries, and state insurance regulators), the short settlement periods, or countervailing incentives at the (higher) company level. Our second hypothesis is:

H2: Health insurance plans with pre-managed MLRs substantially greater than their required MLR understate claims expense, thereby decreasing their reported MLRs and increasing reported earnings.

3. Sample Selection and Health Plan Descriptive Statistics

3.1 Health Insurance Plans and Claims

Loss reserve errors of P/C insurers have been widely used to measure managerial reporting discretion (Smith, 1980; Weiss, 1985; Grace, 1990; Petroni, 1992; Beaver et al., 2003). The loss reserve is management's estimate of the total liability for claims incurred during a given year. Some of these claims are known and possibly settled during that year, while other claims remain outstanding and must be estimated. In subsequent years (generally for the next 10 years), P/C insurers must disclose revised estimates of a given year's loss reserve as claims are processed and more information becomes available. Petroni (1992) and McNichols (2000), among others, note that the revised loss reserve amount provides a reasonable proxy for managers' unbiased expectations of a given year's incurred claims. Accordingly, the difference between the revised loss reserve amount and the

16. For FP plans, lower income tax bills are a potential exception.

amount initially reported provides an estimate of management's discretion in reporting claims.

Prior research shows that P/C companies exercise discretion over loss reserves to manage earnings, meet solvency requirements, reduce taxable income, comply with regulations, and meet targeted financial strength ratings (Petroni, 1992; Gaver and Paterson, 1999, 2004; Beaver et al., 2003; Grace and Leverty 2012; Eastman et al., 2017). Eckles and Halek (2010) and Eckles et al. (2011) explore the roles of executive compensation and corporate governance in P/C managers' loss reserving and smoothing behavior. Other research examines factors that mitigate managers' discretion in estimating reserves, such as auditor size (Petroni and Beasley, 1996), state accreditation regulations, monitoring, auditor-client dynamics (Gaver and Paterson, 2000, 2001, 2007), and audit committee characteristics (Hsu et al., 2018).[17]

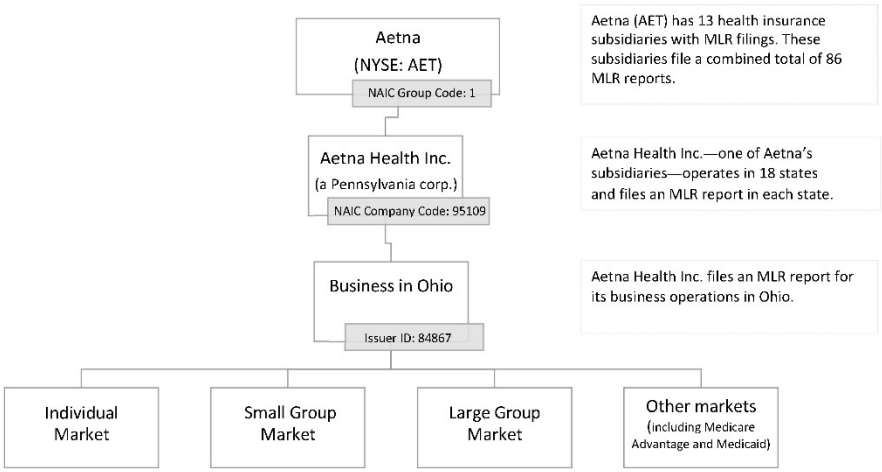
Like P/C insurance studies, we use the difference between a health plan's revised claims amount and the claims amount initially reported to estimate the amount by which a manager initially over or underestimated claims. However, several features of our study enhance the validity of our empirical measures and the reliability of our inferences relative to prior P/C studies. First, our unit of analysis is the health *plan*, not the insurance company. Figure 1 provides the institutional and reporting structure of a health insurance company. The highest level is Aetna, the publicly-traded parent company. Prior studies of P/C insurers are positioned at the second level of Figure 1—the NAIC Company level—which captures an aggregation of many underlying businesses, insurance markets and locations. In Figure 1, Aetna Health (the NAIC Company) operates in 18 states, and each state has multiple health plans.[18] A study designed comparably to prior P/C studies would examine a single loss reserve measure reported by Aetna Health for all insurance markets and states combined. In contrast, the MLR provisions apply at the plan level, so our study is positioned at the lowest level of Figure 1. Specifically, we examine how plan managers exercise reporting discretion for claims associated with

17. Hsu et al. (2015) examine the relations among insurer characteristics, auditor choice and auditor fees.

18. Summing across plan net income for all three markets for all states of operations will not equal NAIC company- level net income because NAIC companies have significant business operations other than these three insurance markets. NAIC companies also have significant revenues and expenses from government plans (Medicare and Medicaid), other health plan markets, business lines other than health insurance, and net investment income and gains/losses.

Individual, Small Group and Large Group health insurance policies written in a given state (Ohio in the case of the Figure 1 example).[19,20]

Figure 1:
Health Insurance Arrangement for Aetna Using 2013 MLR Filings



Second, health insurance claims are inherently different from P/C claims. Health claims are better defined and have considerably shorter settlement periods (FASB, 2015; Gamage et al., 2007; Chadick et al., 2009). A significant portion of health insurance claims are settled within one year (FASB, 2015), compared with P/C claims that have average settlement periods of at least five years (Beaver et al., 2003).[21] Thus, while most P/C studies use loss reserve revisions over a five-year

19. To more fully understand the benefits of our plan-level analysis, consider the following from Figure 1. We examine the claims error for each market in Ohio. The 2011 claims estimate for the Ohio Large Group market is $86.8 million. Compare this amount with the aggregate 2011 claims estimate for all of Aetna Health's (NAIC: 95109) Large Group plans, which totals $1.7 billion across 18 states. At an even more aggregate level that is analogous to that used in prior P/C research, the total claims estimate for 2011 would be $3.1 billion, which is the aggregate claims estimate for all of Aetna Health's (NAIC: 95109) insurance business lines operating in 18 different states. By market, the breakdown is (in millions): $78; $648; $1,693; $671 and $9 for Individual, Small Group, Large Group, Government and Other plans. Thus, our plan-level analysis is significantly more granular, which increases the validity of our empirical measures (e.g., reduces measurement error in claims errors, plan earnings, and relevant MLR and earnings thresholds), and thus the reliability of our inferences.

20. In addition to the three commercial markets we examine, insurers operate in other health insurance markets, primarily government-sponsored programs (e.g., Medicare Advantage and Medicaid). Beginning in 2014, the ACA's 85% MLR provisions apply to Medicare Advantage Part C and Part D Plans. Medicaid managed care plans are subject to an 85% MLR provision for contracts beginning on or after July 1, 2017, with enforcement at the state's option.

21. Health insurance claims generally relate to costs for hospital, physician, drug and dental benefits. In contrast, P/C claims include large and difficult-to-estimate liabilities, such as claims

period, we measure revisions in health claims over a two-year period. Managers have less discretion over reserves in short-tailed lines of business, suggesting that it may be more difficult for health plan managers to strategically over or underestimate claims (Gaver and Paterson, 2004). However, the shorter settlement period and nature of health claims, combined with plan-level analyses, reduce the noise in managers' claims estimates. This allows for a more precise measure of management discretion if it does exist.

A third appealing feature of our research design is that we examine whether health plan managers over or understate claims in response to a well-defined, or noise-free, regulatory target—an MLR of 80% (or 85%). In contrast, P/C studies test whether company managers exercise discretion over loss reserves to meet certain earnings, regulatory or tax goals (e.g., increase financial solvency). These targets are generally less precise than the MLR target and can be achieved, in part, through management's non-claims reporting choices (e.g., non-claims discretionary accruals).

While our study's unit of analysis—i.e., health plans—improves the validity of our "management discretion" measure relative to prior P/C studies, the actual existence of such discretion at the plan level is an open question. While P/C *company executives* likely have the authority and ability to exercise reporting discretion over claims, consistent with company-level incentives and their own self-interest, it is not clear that lower-level *health plan managers* possess the necessary authority and ability to exercise discretion over claims estimates in response to plan-level MLR and earnings incentives. Exercising such discretion may be particularly difficult for lower-level plan managers if their incentives run counter to those of upper-management.

3.2 Sample Selection

All data used in this study are obtained from MLR Reporting Forms for 2011 through 2015.[22] These calendar year forms provide information separately for each type of plan operated in a state. The MLR provisions only apply to insurers with at least 1,000 enrollees in a market segment. Thus, we include in our initial sample all Individual, Small Group and Large Group plans with at least 1,000 enrollees.[23] We

for toxic waste clean-up, asbestos- related illnesses, and other environmental remediation (FASB, 2015), as well as liability claims for economic and non-economic damage settlements (e.g., lost wages, compensation for pain and suffering). The shorter settlement periods and more defined claims led the Financial Accounting Standards Board (FASB) to impose significantly different requirements for health insurers' financial statements versus P/C insurers' financial statements (FASB, 2015).

22. These data can be downloaded from the Public Use Files at *http://www.cms.gov/CCIIO/Resources/Data- Resources/mlr.html*. The ACA's MLR reporting requirement became effective Jan. 1, 2011, so insurers did not file MLR reports with the CMS for years prior to 2011.

23. Plans with fewer than 1,000 enrollees are deemed to lack sufficient experience to calculate a meaningful MLR. For 2013 and all subsequent years, the 1,000-enrollee threshold is based on

delete all plan-years with non-positive claims or premiums or an MLR less than 0.20. As discussed further in Section 4, our test years are 2011 through 2013, given that we need year t+2 data for claims; i.e., 2015 data are used to calculate managers' discretion for 2013. For 2011–2013, our final sample of 4,642 plan years includes 1,643; 1,532 and 1,467 Large Group, Small Group and Individual plan-year observations, respectively.

Figure 2 displays the 2013 MLR reporting form for Aetna Health Inc.'s Large Group health plans in Ohio. Companies must use a calendar year for MLR reporting and base their reports on information through March 31 (e.g., claims related to the report year but processed after Dec. 31). The 2011 estimate of 2011 claims for this plan is $86,780,532. The 2013 estimate of 2011 claims is $88,298,402. In our research design, we attribute the $1,517,870 underestimate of 2011 claims to management's discretion.

Figure 2: Excerpt from 2013 Medical Loss Ratio Reporting Form*

Aetna Health Inc. – Report for the company's Large Group Health Plans in Ohio
(NAIC Company Code: 95109; Issuer ID: 84867)

Part 4 NOTE: REFER TO MLR INSTRUCTIONS, FORMULAS RESOURCE AND TABLES RESOURCE FOR IMPORTANT INFORMATION ABOUT COMPLETING EACH COLUMN AND ROW.		Large Group			
		PY2	PY1	CY	Total
		9	10	11	12
1.	Medical Loss Ratio Numerator				
1.1	Adjusted incurred claims as reported on MLR Form for prior year(s)	$ 86,780,532	$ 84,904,559		
1.2	Adjusted incurred claims as of 3/31 of the year following the MLR reporting year	$ 88,298,402	$ 81,915,430	$ 77,908,841	$ 248,122,674

Adjusted incurred claims for 2011 reported in 2011	$ 86,780,532
– Adjusted incurred claims for 2011 reported in 2013	(88,298,402)
Amount that claims were understated on initial filing	(1,517,870)

* The form displayed is for Aetna Health Inc.'s 2013 MLR reporting year. PY2 represents 2011, and Line 1.1 provides the 2011—i.e., March 31, 2012—estimate of 2011 claims ($86,780,532). Line 1.2 provides the 2013—i.e., March 31, 2014—estimate of 2011 claims ($88,298,402).

3.3 Health Plan Descriptive Statistics

Two important factors characterize health insurance plans: the market they serve—i.e., Individual, Small Group or Large Group—and their status as FP or NFP plans. In describing the sample, and in conducting tests and reporting results, we sometimes report based on the full sample and at other times based on samples segmented by market and/or tax status. Our presentation choices are intended to report on a meaningful yet relatively parsimonious basis.

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the aggregation of the current and two prior years. For 2011, the threshold is based on the current year only (2011). For 2012, the threshold is based on the aggregation of the current and prior year (2011 and 2012).

Table 1 reports descriptive statistics for five key plan attributes, with the sample segmented by both market and tax status. The first three measures described in Table 1—Claims, Premiums, and Enrollment—describe health plans' size. Median enrollment in FP (NFP) Large Group plans is 11,373 (66,266); analogous medians for Small Group and Individual plans are 5,955 (21,227) and 3,044 (15,187), respectively (means are larger than medians due to the existence of a few large plans in each sub-sample). As is evident, NFP plans tend to be much larger than FP plans, by factors of approximately four to six, depending upon the market and measure of plan size considered.

Table 1:
Descriptive Statistics for Plan Characteristics, By Tax Status and Market

Segment Panel A: Large Group

	For-profit plans (n=1,278)					Not-for-profit plans (n=365)				
	Mean	Median	Q1	Q3	St. Dev.	Mean	Median	Q1	Q3	St. Dev.
$Claims_{it}$ ($000's)	163,382	39,949	9,923	133,284	410,381	725,790	269,834	63,621	728,897	1,833,416
$Premiums_{it}$ ($000's)	193,446	47,883	11,855	164,800	476,414	818,309	304,233	74,529	829,449	2,055,915
$Enrollment_{it}$	47,765	11,373	3,102	38,480	132,389	183,815	66,266	18,097	181,771	453,336
Actual MLR_{it}	0.8971	0.8830	0.8560	0.9240	0.0774	0.9177	0.9100	0.8860	0.9380	0.0520
% plans compliant	0.8028	1.000	1.000	1.000	0.3980	0.9753	1.000	1.000	1.000	0.1553

Panel B: Small Group

	For-profit plans (n=1,202)					Not-for-profit plans (n=330)				
	Mean	Median	Q1	Q3	St. Dev.	Mean	Median	Q1	Q3	St. Dev.
$Claims_{it}$ ($000's)	76,328	19,297	5,565	63,993	173,251	211,119	76,895	30,209	197,000	385,743
$Premiums_{it}$ ($000's)	97,323	24,994	7,049	82,297	222,509	254,434	87,724	33,431	243,171	459,847
$Enrollment_{it}$	22,054	5,955	1,653	19,581	46,825	59,963	21,227	7,852	59,545	108,832
Actual MLR_{it}	0.8592	0.8400	0.8040	0.8991	0.0882	0.8878	0.8712	0.8280	0.9239	0.8841
% plans compliant	0.7762	1.000	1.000	1.000	0.4170	0.9303	1.000	1.000	1.000	0.2550

Panel C: Individual

	For-profit plans (n=1,219)					Not-for-profit plans (n=248)				
	Mean	Median	Q1	Q3	St. Dev.	Mean	Median	Q1	Q3	St. Dev.
$Claims_{it}$ ($000's)	27,136	6,604	2,660	24,034	70,727	119,209	43,984	18,666	107,016	207,011
$Premiums_{it}$ ($000's)	34,110	8,261	3,401	31,712	88,549	137,684	44,823	17,830	118,261	240,865
$Enrollment_{it}$	12,564	3,044	1,192	12,431	33,246	48,944	15,187	5,112	54,016	82,834
Actual MLR_{it}	0.8585	0.8300	0.7700	0.9346	0.1396	0.9347	0.9150	0.8409	0.9899	0.1225
% plans compliant	0.6308	1.000	0	1.000	0.4828	0.9315	1.000	1.000	1.000	0.2532

Table 1 shows that health plans tend to report compliant MLRs. Among Large Group plans, which require an 85% MLR, median MLRs for FP and NFP plans are 0.883 and 0.910, respectively. Similarly, Small Group and Individual plans, which require 80% MLRs, report median MLRs in the 0.830 to 0.915 range. The MLRs for NFP plans (medians of 0.910, 0.871 and 0.915 for Large Group, Small Group and Individual plans, respectively) generally exceed those of FP plans (medians of 0.883, 0.840 and 0.830, respectively), which is consistent with FP plans being more attentive to profitability concerns. Table 1 reveals that the percentage of compliant plans is greatest for Large Group plans (0.803 and 0.975 for FP and NFP plans, respectively), followed by Small Group (0.776 and 0.930) and Individual (0.631 and 0.932) plans. Consistent with the median MLR values, compliance with the MLR provisions is more prevalent among NFP plans than FP plans.

4. Empirical Design

4.1 Model

Our objective is to examine the association between errors in health plans' claims estimates (*ClaimsError*) and their hypothetical compliance status. We define *ClaimsError* as:

$$ClaimsError_{t,t+2} = [ClaimsEstimate_{t,t} - ClaimsEstimate_{t,t+2}] / MLRDenominator_{t} \quad (1)$$

where $ClaimsEstimate_{t,t}$ is the estimate of year t claims reported at the end of year t, and $ClaimsEstimate_{t,t+2}$ is the estimate of year t claims reported at the end of year t+2. Thus, we assume that managers' discretion is revealed by the difference between their year t and t+2 estimates of year t claims.[24] *MLRDenominator*$_{t}$ is a plan's MLR denominator for year t, and it is defined by the MLR provisions as a plan's premiums for year t minus allowable deductions; i.e., certain taxes, licenses and regulatory fees.

H1 posits that *ClaimsError* will be positive for hypothetically noncompliant plans. We determine a plan's hypothetical compliance status using its pre-managed MLR for year t, defined as:

$$Pre\text{-}managed\ MLR_{t,t+2} = MLR\ Numerator_{t,t+2} / MLR\ Denominator_{t} \quad (2)$$

where $MLR\ Numerator_{t,t+2}$ is what a plan's MLR numerator would have been had it been calculated using $ClaimsEstimate_{t,t+2}$ instead of $ClaimsEstimate_{t,t}$. Accordingly, $Pre\text{-}managed\ MLR_{t,t+2}$ can be interpreted as what a plan's MLR would have been had it been calculated using our measure of a manager's unbiased claims estimate for year t. Plans with $Pre\text{-}managed\ MLR_{t,t+2}$ less than 80% (85% for Large Group) are classified as hypothetically noncompliant.

H2 posits that *ClaimsError* will be negative for plans with pre-managed MLRs that are high enough for managers to understate claims and increase earnings while still remaining MLR compliant. In our main tests, we assume that a plan has sufficient cushion to manage its MLR downward if its pre-managed MLR is more than 0.10 greater than required; i.e., if pre-managed MLR exceeds 0.90 for Individual and Small Group plans or 0.95 for Large Group plans.

24. For MLR purposes, *ClaimsEstimate* is equal to claims incurred for year t (both paid and unpaid); plus direct claim reserves for year t claims; plus the year t change in direct contract reserves; plus experience rating refunds paid or received for claims incurred in year t, as well as related reserves not yet paid or received; plus paid or accrued medical incentive pools and bonuses for year t; minus health care receivables for year t; plus contingent benefit and lawsuit reserves for claims incurred in year t; plus group conversion charges and blended rate adjustments (see Part 2 of the MLR reporting form).

To test H1 and H2, we model *ClaimsErrorit,t+2* as:

$$ClaimsErrorit,t+2 = \beta 0 + \beta 1HypNoncompliantit + \beta 2OverCompliantit + \beta 3\%ClaimsPaidit + \beta 4Log(Life\ yearsit) + \beta 5HHIndexit + \beta 6HighDeductibleit + \beta 7RateRegit + \beta 8POS\_Incomeit + \beta 9Log(Group\ sizeit) + \varepsilon \quad (3)$$

where *HypNoncompliant* equals 1 if a plan's pre-managed MLR is less than 0.80 in year t (0.85 for Large Group) (0 otherwise); *OverCompliant* equals 1 if a plan's pre-managed MLR exceeds 0.90 in year t (0.95 for Large Group) (0 otherwise); *%ClaimsPaid* is the percentage of a plan's incurred claims for year t that were actually paid in year t; *Log(Lifeyears)* is the natural logarithm of total plan enrollment in year t; *HHIndex* is the Herfindahl-Hirschman Index (HHI) for a plan's market and state (computed separately by year); *HighDeductible* equals 1 if a plan's deductible is greater than $2,500 (0 otherwise); *RateReg* equals 1 if a plan operates in a state with stringent rate regulations (0 otherwise); *POS_Income* equals 1 if a plan reports positive net income before taxes for year t (0 otherwise); and *Log(GroupSize)* is the natural logarithm of the number of companies in the insurance plan's group. In estimating equation (3), we also include year and state dummy variables.

If hypothetically noncompliant plans overstate claims (H1), then $\beta 1$ will be positive. If plans with pre-managed MLRs substantially greater than their required MLRs understate claims (H2), then $\beta 2$ will be negative. *%ClaimsPaid* controls for the percentage of claims ultimately paid that is paid in the first year. If a high level of claims in the first year leads managers to overestimate the claims that will ultimately be paid, then $\beta 3$ will be positive. If managers over- reserve under stringent rate regulation to facilitate subsequent rate increases (Grace and Leverty 2010), then $\beta 7$ will be positive. Alternatively, $\beta 7$ will be negative if managers under-reserve when facing stricter rate regulation (Nelson, 2000). If a desire to report plan-level profits induces managers to understate claims, then $\beta 8$ will be negative. We make no predictions for the other variables in equation (3), which are included to control for plan- or market-level factors contemplated in prior research (e.g., a plan's size [*Log(LifeYears)*], deductible [*HighDeductible*], earnings [*POS_Income*] and administrative complexity [*Log(GroupSize)*]) and potentially affect managers' propensities to under or overstate claims.[25]

25. We compute *HHIndex* separately for each market, state and year. *HHIndex* is the sum of the squares of participants' market shares (Robinson, 2004). A plan's market share for a given year is its share of the total enrollment for all plans in the same market and state. *HHIndex* values fall between 0 (exclusive) and 1 (inclusive), and the extent of competition is inversely related to *HHIndex*. Consistent with Grace and Leverty (2010), we classify states as having stringent rate regulations for a health insurance market (*RateReg*=1) if the state either dictates rates or requires

4.2 Descriptive Statistics

Table 2 displays descriptive statistics for all variables included in our main tests. Panel A (Panels B and C) shows statistics for the full sample (FP and NFP sub-samples). Average claims errors are relatively small, which is not surprising given that plans both over and underestimate claims and health claims' relatively short settlement periods potentially provide plan managers with limited discretion. Mean *ClaimsError* is 0.0005 in the full sample, and it is substantially greater in the NFP sample (0.0016) than the FP sample (0.0003). Hypothetical noncompliance is far more common among FP plans (about 27%) than NFP plans (7%). In contrast, FP plans are far *less* likely to have pre-managed MLRs substantially greater than the minimum required. Mean *OverCompliant* is 23% among FP plans and 34% among NFP plans. Overall, the lower MLRs for FP plans are consistent with FP plan managers attending to profitability concerns in a more vigorous manner than NFP plan managers. Table 2 (Panel A) also shows that the mean and median *%ClaimsPaid* values are 96.6% and 98.5%, suggesting that (on average) from 1.4% to 3.5% of claims are settled after year t. These unsettled claims provide managers discretion over their claims estimates.

Among control variables included in equation (3), the most striking differences between the FP and NFP samples are for *HighDeductible*, *RateReg* and *POS_Income*. Among FP plans, about 33% of plans have deductibles greater than $2,500—i.e., *HighDeductible* = 1—for NFP plans, less than 4% of plans have high deductibles. About 59% of NFP plans operate in states with stringent rate regulations, while only 51% of FP plans operate in such states, suggesting that FP health insurers may gravitate toward more lenient regulatory regimes. Lastly, 65% of FP plans report positive net income, whereas only 57% of NFP plans report positive profits.[26,27]

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that insurers receive prior approval of rates. *RateReg* can vary across markets within a state. We use the information in Part 1 of the MLR reports to calculate a plan's pre-tax income.

26. Like the results in Table 1, the results in Table 2 for *Log(LifeYears)* indicate that NFP plans are (on average) larger than FP plans. The results for *Log(GroupSize)* suggest that FP plans tend to be members of larger groups.

27. Not tabulated Pearson correlation coefficients for the full sample (N = 4,642) reveal a few noteworthy relations. The simple correlations of *HypNoncompliant* and *OverCompliant* with *ClaimsError* are 0.0765 and -0.0902, respectively ($p<0.01$), consistent with H1 and H2. As expected, *%ClaimsPaid* is positively correlated with *ClaimsError* (0.1193; $p<0.01$), and *POS_Income* is negatively correlated with *Claims Error* (-0.0263; $p<0.10$). *HypNoncompliant* plans are more likely to have high deductibles, report positive income, and be members of larger groups (all p-values<0.01). *OverCompliant* is negatively correlated with *Log(LifeYears)* and *POS_Income*, suggesting that plans with substantially high MLRs tend to be smaller and less likely to report positive income.

Table 2:
Descriptive Statistics for Regression Variables, For Full Sample and By Tax Status

Panel A: Full Sample (n=4,642)

	Mean	Median	Q1	Q3	St. Dev.
$ClaimsError_{t,t+2}$	0.0005	0.0002	-0.0025	0.0041	0.0228
$HypNoncompliant_{it}$	0.2290	0	0	0	0.4202
$OverCompliant_{it}$	0.2570	0	0	1.000	0.4370
$\%ClaimsPaid_{it}$	0.9657	0.9849	0.9639	0.9963	0.0520
$Log(LifeYears_{it})_{it}$	9.0641	9.0558	7.6507	10.3381	1.795
$HHIndex_{it}$	0.3093	0.2675	0.1869	0.3933	0.1630
$HighDeductible_{it}$	0.2699	0	0	1.000	0.4440
$RateReg_{it}$	0.5261	1.000	0	1.000	0.4994
POS_Income_{it}	0.6383	1.000	0	1.000	0.4805
$Log(GroupSize)_{it}$	2.0893	1.099	1.000	3.434	1.2178

Panel B: For Profit (n=3,699)

	Mean	Median	Q1	Q3	St. Dev.
$ClaimsError_{t,t+2}$	0.0003	0.0003	-0.0027	0.0043	0.0225
$HypNoncompliant_{it}$	0.2698	0	0	1.000	0.4439
$OverCompliant_{it}$	0.2347	0	0	0	0.4238
$\%ClaimsPaid_{it}$	0.9652	0.9842	0.9634	0.9960	0.0519
$Log(LifeYears_{it})_{it}$	8.7661	8.700	7.411	9.997	1.704
$HHIndex_{it}$	0.3145	0.2813	0.1890	0.4020	0.1612
$HighDeductible_{it}$	0.3287	0	0	1.000	0.4698
$RateReg_{it}$	0.5104	1.000	0	1.000	0.5000
POS_Income_{it}	0.6548	1.000	0	1.000	0.4755
$Log(GroupSize)_{it}$	2.374	2.890	1.000	3.555	1.206

Panel C: Not-for-Profit (n=943)

	Mean	Median	Q1	Q3	St. Dev.
$ClaimsError_{t,t+2}$	0.0016	0	-0.0014	0.0025	0.0240
$HypNoncompliant_{it}$	0.0689	0	0	0	0.2535
$OverCompliant_{it}$	0.3446	0	0	1.000	0.4755
$\%ClaimsPaid_{it}$	0.9676	0.9872	0.9653	0.9971	0.0523
$Log(LifeYears_{it})_{it}$	10.233	10.225	9.122	11.467	1.662
$HHIndex_{it}$	0.2889	0.2405	0.1664	0.3558	0.1683
$HighDeductible_{it}$	0.0392	0	0	0	0.1943
$RateReg_{it}$	0.5875	1.000	0	1.000	0.4925
POS_Income_{it}	0.5737	1.000	0	1.000	0.4948
$Log(GroupSize)_{it}$	0.9745	1.000	1.000	1.000	0.1841

ClaimsError is the year t estimate of year t claims minus the year t+2 estimate of year t claims.
HypNoncompliant equals 1 if a plan's pre-managed MLR is less than 0.80 (0.85 for Large Group) (0 otherwise);
OverCompliant equals 1 if a plan's pre-managed MLR exceeds 0.90 (0.95 for Large Group) (0 otherwise);
%ClaimsPaid is the percentage of year t claims actually paid in year t; *Log(LifeYears)* is the natural logarithm of total plan enrollment; *HHIndex* is the Herfindahl-Hirschman Index (HHI) for a plan's market and state; *HighDeductible* equals 1 if a plan's deductible is greater than or equal to $2,500 (0 otherwise); *RateReg* equals 1 if a plan operates in a state with stringent rate regulation (0 otherwise); *POS_Income* equals 1 if a plan reports positive net income before taxes (0 otherwise); *Log(GroupSize)* is the natural logarithm of the number of companies in the insurance plan's group.

5. Results

5.1 Univariate Test Results

Table 1A in the Appendix displays results of univariate tests for the full sample (Panel A) and FP and NFP sub-samples (Panels B and C, respectively). We use two-sample t-tests and Wilcoxon tests to test whether *ClaimsErrort,t+2* is associated with MLR compliance status, as predicted by H1 and H2. We also test whether the percentage of plans with positive *ClaimsErrort,t+2* is consistent with our H1 and H2 predictions.

As explained in the Appendix, the univariate results generally support H1 and H2. Mean and median *ClaimsErrort,t+2* for hypothetically noncompliant plans are significantly greater than the mean and median *ClaimsErrort,t+2* for hypothetically compliant plans (supporting H1). Likewise, the prediction that hypothetically noncompliant plans, compared to other plans, are more likely to have positive *ClaimsErrort,t+2* is strongly supported. For the full sample and FP sub-sample, all univariate tests strongly support the H2 prediction that plans with substantial pre-managed MLR cushions have a smaller average *ClaimsErrort,t+2* and a greater incidence of negative *ClaimsErrort,t+2* than compliant plans without such a cushion. However, the univariate results provide no evidence that NFP plans with very high pre-managed MLRs underestimate claims expense in order to boost profits.

5.2 Regression Results

Table 3 displays the results of estimating equation (3). We display results for the full sample, FP and NFP sub-samples (Panel A), and each market segment (Panel B). Results for the full sample and the FP and NFP sub-samples all strongly support H1. For the full sample, the coefficient on HypNoncompliant (β1) is 0.0028 and highly significant (t=4.94; p<0.01). The □1 coefficient is also significantly positive for the FP and NFP sub-samples at p<0.01. These results are consistent with managers exercising upward discretion over claims in response to the MLR provisions. On average, when a health plan's pre-managed MLR is less than required, managers will overestimate claims in order to increase a plan's reported MLR and reduce or eliminate rebate payments. As explained more fully in Section 5.5, we estimate that this managerial discretion reduced health plans' rebates by as much as $325 million during 2011–2013, or 17% of the rebates actually paid.

The results in Table 3 (Panel A) also support the H2 prediction that health plans with ample cushion in their pre-managed MLRs will exercise downward discretion over claims, thereby reducing their MLRs and increasing reported earnings. In the full sample, the coefficient on *OverCompliant* (β2) is negative and highly significant (β2 = -0.0061; t=-7.86; and p<0.01). In the sub-samples, β2 is also negative and significant (β2 = -0.0068; t=-7.19; p<0.01; β2 = -0.0049; and t=-3.46, p<0.01 in the FP and NFP samples, respectively). As shown in Section 5.5, these claims

understatements constitute approximately 34% (14%) of profitable (unprofitable) plans' pre-tax earnings in the full sample.

Table 3:
Regression Results for *ClaimsErrort,t+2*

Panel A: Full Sample and By Tax Status

Variable			Full Sample		For-Profit		Not-for-Profit	
Intercept	β_0		-0.0454	(-5.42)***	-0.0525	(-5.48)***	-0.0041	(-0.24)
HypNoncompliant$_{it}$	β_1	+	0.0028	(4.94)***	0.0025	(4.13)***	0.0070	(3.23)***
OverCompliant$_{it}$	β_2	-	-0.0061	(-7.86)***	-0.0068	(-7.19)***	-0.0049	(-3.46)***
%ClaimsPaid$_{it}$	β_3	+	0.0544	(6.55)***	0.0633	(6.60)***	0.0172	(1.16)
Log(Life years)$_{it}$	β_4	?	-0.0005	(-3.09)***	-0.0008	(-4.14)***	0.0000	(0.00)
HHIndex$_{it}$	β_5	?	-0.0017	(-0.66)	-0.0024	(-0.81)	0.0020	(0.47)
HighDeductible$_{it}$	β_6	?	-0.0001	(-0.20)	-0.0002	(-0.26)	0.0040	(1.66)*
RateReg$_{it}$	β_7	?	0.0007	(0.81)	0.0007	(0.74)	-0.0003	(-0.23)
POS_Income$_{it}$	β_8	-	-0.0045	(-7.58)***	-0.0045	(-6.66)***	-0.0045	(-3.45)***
Log(Group size)$_{it}$	β_9	?	-0.0002	(-0.74)	0.0000	(0.12)	-0.0050	(-1.31)
Year effects			Yes		Yes		Yes	
State effects			Yes		Yes		Yes	
No. of observations			4,642		3,699		943	
No. of plans			1,951		1,573		378	
Adjusted R^2			0.058		0.070		0.039	

Panel B: By Market Segment

Variable			Large Group		Small Group		Individual	
Intercept	β_0		-0.0700	(-5.50)***	-0.0419	(-3.07)***	-0.0194	(-1.43)
HypNoncompliant$_{it}$	β_1	+	0.0030	(2.97)***	0.0031	(3.44)***	0.0019	(1.60)
OverCompliant$_{it}$	β_2	-	-0.0069	(-4.79)***	-0.0050	(-4.09)***	-0.0069	(-5.12)***
%ClaimsPaid$_{it}$	β_3	+	0.0824	(6.29)***	0.0556	(4.40)***	0.0324	(2.56)**
Log(Life years)$_{it}$	β_4	?	-0.0000	(-0.17)	-0.0005	(-2.10)**	-0.0004	(-1.27)
HHIndex$_{it}$	β_5	?	-0.0199	(-1.28)	-0.0391	(-2.15)**	-0.0043	(-0.18)
HighDeductible$_{it}$	β_6	?	0.0006	(0.20)	-0.0007	(-0.51)	-0.0038	(-2.56)**
RateReg$_{it}$	β_7	?	-0.0036	(-0.81)	0.0075	(1.50)	0.0096	(1.15)
POS_Income$_{it}$	β_8	-	-0.0071	(-6.59)***	-0.0041	(-4.05)***	-0.0027	(-2.54)**
Log(Group size)$_{it}$	β_9	?	-0.0005	(-1.55)	0.0002	(0.58)	0.0003	(0.59)
Year effects			Yes		Yes		Yes	
State effects			Yes		Yes		Yes	
No. of observations			1,643		1,532		1,467	
No. of plans			657		625		669	
Adjusted R^2			0.104		0.076		0.054	

ClaimsError is the year t estimate of year t claims minus the year t+2 estimate of year t claims. *HypNoncompliant* equals 1 if a plan's pre-managed MLR is less than 0.80 (0.85 for Large Group) (0 otherwise); *OverCompliant* equals 1 if a plan's pre-managed MLR exceeds 0.90 (0.95 for Large Group) (0 otherwise); *%ClaimsPaid* is the percentage of year t claims actually paid in year t; *Log(LifeYears)* is the natural logarithm of total plan enrollment; *HHIndex* is the HHI for a plan's market and state; *HighDeductible* equals 1 if a plan's deductible is greater than or equal to $2,500 (0 otherwise); *RateReg* equals 1 if a plan operates in a state with stringent rate regulation (0 otherwise); *POS_Income* equals 1 if a plan reports positive net income before taxes (0 otherwise); *Log(GroupSize)* is the natural logarithm of the number of companies in the insurance plan's group.
*,**,*** Indicate significance at 10%, 5% and 1%, respectively, using a two-tailed test. All t-statistics are based on standard errors clustered by issuer.

Table 3 (Panel B) presents results separately for each market. The results for *HypNoncompliant* and *OverCompliant* are consistent with the Panel A results;

although, the *HypNoncompliant* coefficient is just shy of significance in the Individual market ($\beta 1$ = 0.0019; t=1.60; and p=0.11 in a two-tailed test). These results suggest that our inferences for H1 and H2 are not driven by managerial discretion over claims in any particular market. Overall, we conclude that managers of hypothetically noncompliant plans overestimate claims to increase reported MLRs and reduce rebate payments (H1), and managers of plans with substantially high pre-managed MLRs underestimate claims to decrease their MLRs and increase plan-level earnings (H2).[28]

In Table 3, Panel A's full sample results, the magnitude of $\beta 2$ is approximately 118% *larger* than the magnitude of $\beta 1$ (-0.0061 vs. 0.0028). This relationship is clearly affected by our empirical measures and models; nevertheless, this suggests that health plan managers are at least as attentive to downward claims discretion as they are to upward claims discretion. Further, we note that the relationship between $\beta 1$ and $\beta 2$ in the full sample is driven by the FP sample, which includes 80% of all observations and has estimates of $\beta 1$ and $\beta 2$ that are very similar in magnitude to the full sample. Thus, managers of FP health plans seem particularly attentive to exercising downward discretion over claims (and thus upward discretion over earnings) when their pre-managed MLRs substantially exceed the requirement. In contrast, for the NFP sample, the estimate of $\beta 2$ is 30% *smaller* than the estimate of $\beta 1$, which is consistent with managers of NFP plans being less attentive to earnings-related incentives and more attentive to MLR compliance.[29,30]

28. In both panels of Table 3, results for *%ClaimsPaid* and *POS_Income* (β_3 and β_8, respectively) are consistent with expectations. Results suggest that high first-year claims payments induce managers to overestimate the claims that will ultimately be paid, and managers of profitable health plans are more likely to have underestimated claims. The *RateReg* coefficient (β_7) is not significant in any Table 3 results, providing no evidence that managers either systematically overestimate or underestimate claims when operating in states with stringent rate regulations.

29. Managers' difficulty in estimating claims may vary across plans and time. To help control for the possible effects of forecasting difficulty on *ClaimsError*, we include a measure of claims variability (*ClaimsVar*) in equation (3) and repeat all analyses. We compute *ClaimsVar* using numerous measures—i.e., the variance, or coefficient of variation, of *ClaimsError*, MLR and claims—computed at several different levels; i.e., for the plan, the insurer, or the market in a given state. We also include a measure of variability in premiums in equation (3) and repeat all analyses. All results are essentially identical to those reported in Tables 3 and 4.

30. If plan managers from publicly traded companies are more sensitive to MLR and earnings incentives, then $\square_1$ ($\square_2$) would be more positive (more negative) for plans of publicly traded companies versus other plans. Alternatively, if public companies are subject to more scrutiny by auditors and/or state insurance regulators, then $\square_1$ ($\square_2$) would be less positive (less negative). Therefore, we re-ran all Table 3 regressions after also including two interaction variables: *HypNoncompliant*PubliclyTraded* and *OverCompliant*PubliclyTraded*, where *PubliclyTraded*=1 if a plan's parent company is publicly traded, and zero otherwise. None of the interaction variables were significantly different from zero at p<0.10 using a two-tailed test, with the exception of *OverCompliant*PubliclyTraded* for Large Group plans, which was significantly positive ($\square$=0.0047 and t=1.96). This suggests that large group plan managers exercise *less* downward discretion of claims (to increase earnings) when MLRs are very high.

5.3 Additional Analyses

Prior studies show that firms' earnings are managed to avoid reporting small losses (Burgstahler and Dichev, 1997; Degeorge et al., 1999). Beaver et al. (2003) examine a sample of P/C insurers and find that public and mutual insurers, but not private insurers, understate firm-level loss reserves to avoid reporting small losses. The authors conjecture that private companies have more concentrated ownership, which allows for better monitoring of management's actions, thereby decreasing managers' need and/or ability to engage in earnings management. Leone and Van Horn (2005) show that nonprofit hospital chief executive officers (CEOs) manage earnings to avoid losses. While nonprofit CEOs are not concerned with maximizing profits, they are concerned with avoiding losses, since losses might suggest that the CEO cannot maintain the hospital as a going concern and increase the likelihood that he or she will be terminated.

Positive plan earnings signal a manager's ability to successfully manage the plan's business operations. Therefore, we explore whether plan-level managers understate claims to avoid small losses. This analysis allows us to examine whether prior evidence on firm-level loss avoidance extends to lower-level managers and whether this behavior varies across FP and NFP insurers. The analysis also examines whether our primary results for H1 and H2 hold after controlling for incentives related to plans' pre-managed earnings.

For this analysis, we segment the loss and profit regions of the pre-managed earnings distribution into two intervals each and denote the four resulting intervals as *Bin1* through *Bin4* using indicator variables. Plans with pre-managed earnings just below and above zero are coded as *Bin2* and *Bin3* (respectively), while *Bin1* and *Bin4* (respectively) capture plans with pre- managed earnings below and above these cutoffs.[31] We posit that plans with pre-managed earnings just below zero (*Bin2 = 1*) are most likely to exercise downward discretion over claims in an effort to report positive earnings.

Table 2A of the Appendix displays results of univariate tests for the full sample (Panel A) and FP and NFP sub-samples (Panels B and C, respectively). The univariate results are consistent with *Bin2* managers understating claims. For the full sample and both sub-samples, mean and median $ClaimsErrort,t+2$ are significantly smaller for *Bin2* plans than other plans. In addition, for the full sample and FP sub-sample, *Bin2* plans have a smaller percentage of positive $ClaimsErrort,t+2$ compared with other bins. This comparison is not significant for the NFP sub- sample. Overall, the univariate results strongly suggest that plans with slightly negative pre- managed earnings underestimate claims in an effort to report positive earnings.

31. We follow Beaver et al. (2003) and Degeorge et al. (1999). The interval widths just below and above zero (*Bin2* and *Bin3*, respectively) are twice the interquartile range of scaled plan pre-managed earnings times the negative cube root of sample size. Pre-managed earnings is equal to reported earnings plus (undeflated) *ClaimsError*.

We next examine *Bin2* errors using regression analysis. In re-estimating equation (3), we replace *POS_Income* with *Bin1*, *Bin3* and *Bin4*. Thus, with *Bin2* omitted, we expect the coefficients on *Bin1*, *Bin3* and *Bin4* to be positive. Results presented in Table 4 support our prediction. In the full sample, plans with *Bin2* = 1 clearly exercise more negative discretion over claims, relative to plans with pre-managed earnings in other earnings intervals. The result is also generally true in the FP and NFP samples (though more significant in the former). Moreover, the results for $\beta 1$ and $\beta 2$ in all three samples continue to suggest that managers exercise both upward and downward discretion over claims in response to MLR incentives.[32]

Table 4:
Regression Results for *ClaimsErrort,t+2* – With Pre-Managed Earnings Bins

Variable			Full Sample		For-Profit		Not-for-Profit	
Intercept	β_0		-0.0410	(-4.70)***	-0.0486	(-4.86)***	0.0026	(0.15)
$HypNoncompliant_{it}$	β_1	+	0.0022	(3.76)***	0.0019	(3.03)***	0.0063	(2.77)***
$OverCompliant_{it}$	β_2	-	-0.0043	(-5.70)***	-0.0051	(-5.53)***	-0.0027	(-2.08)**
$Bin1_{it}$	γ_1	+	0.0026	(2.39)**	0.0021	(1.66)*	0.0031	(1.47)
$Bin3_{it}$	γ_2	+	0.0030	(2.77)***	0.0028	(2.18)**	0.0031	(1.48)
$Bin4_{it}$	γ_3	+	0.0033	(3.53)***	0.0028	(2.53)**	0.0044	(2.44)**
$\%ClaimsPaid_{it}$	β_3	+	0.0443	(5.20)***	0.0542	(5.51)***	0.0027	(0.18)
$Log(Life\ years)_{it}$	β_4	?	-0.0005	(-3.45)***	-0.0008	(-4.46)***	-0.0001	(-0.16)
$HHIndex_{it}$	β_5	?	-0.0005	(-0.19)	-0.0012	(-0.38)	0.0029	(0.74)
$HighDeductible_{it}$	β_6	?	0.0003	(0.43)	0.0002	(0.34)	0.0051	(2.08)**
$RateReg_{it}$	β_7	?	0.0005	(0.62)	0.0005	(0.45)	-0.0001	(-0.07)
$Log(Group\ size)_{it}$	β_9	?	-0.0004	(-1.74)*	-0.0002	(-0.72)	-0.0036	(-0.90)
Year effects			Yes		Yes		Yes	
State effects			Yes		Yes		Yes	
No. of observations			4,642		3,699		943	
No. of plans			1,951		1,573		378	
Adjusted R^2			0.045		0.057		0.023	

ClaimsError is the year t estimate of year t claims minus the year t+2 estimate of year t claims. *HypNoncompliant* equals 1 if a plan's pre-managed MLR is less than 0.80 (0.85 for Large Group) (0 otherwise); *OverCompliant* equals 1 if a plan's pre-managed MLR exceeds 0.90 (0.95 for Large Group) (0 otherwise); pre-managed earnings is reported earnings plus *ClaimsError*; *BinNs* segment the plan's pre-managed earnings distribution into four segments. *Bin2* (the omitted bin) is the segment just below zero, and *Bin3* is the segment just above zero. *Bin1* (*Bin4*) is the pre-managed earnings segment below (above) *Bin2* (*Bin3*); *%ClaimsPaid* is the percentage of year t claims actually paid in year t; *Log(LifeYears)* is the natural logarithm of total plan enrollment; *HHIndex* is the HHI for a plan's market and state; *HighDeductible* equals 1 if a plan's deductible is greater than or equal to $2,500 (0 otherwise); *RateReg* equals 1 if a plan operates in a state with stringent rate regulation (0 otherwise); *Log(GroupSize)* is the natural logarithm of the number of companies in the insurance plan's group.
*,**,*** Indicate significance at 10%, 5% and 1%, respectively, using a two-tailed test. All t-statistics are based on standard errors clustered by issuer.

32. We also estimate this specification by market, and results for H1 and H2 were consistent with main results (Table 3). Results for the *Bin* analysis were significant for Large Group and Individual plans, but not significant for Small Group plans. In another specification of equation (3), we controlled for plans that crossed over from negative pre- managed earnings to positive actual earnings by exercising negative discretion over claims estimates. Results from this specification also strongly support H1 and H2.

5.4 Sensitivity Analysis

Prior studies that examine managers' use of discretionary accruals to meet earnings targets (e.g., Leone and Van Horn, 2005) note that measurement error can cause a mechanical relation between the discretionary accruals measure (the dependent variable) and pre-managed earnings (the independent variable). These studies generally use a first-stage regression to estimate discretionary accruals, and then subtract the discretionary accruals estimate from reported earnings to compute pre-managed earnings. Measurement error in the discretionary accruals estimate can induce the mechanical relation between discretionary accruals and pre- managed earnings, and the problem is increasing in the amount of measurement error in accruals.[33] Our research design is less prone to this problem for at least two reasons. First, our measure of reporting discretion (*ClaimsError*) likely has less measurement error than regression- based discretionary accruals estimates because we estimate *ClaimsError* using revisions in claims estimates actually reported by management. Second, prior studies typically use pre- managed earnings (a continuous variable) as their model's independent variable. In contrast, we use indicator variables (*HypNoncompliant* and *OverCompliant*). Any measurement error in these independent variables is much noisier than that of a continuous variable, thus dampening any mechanical relation. Nevertheless, to mitigate concern over a possible measurement error-related mechanical relation influencing our results, we re-run all analyses using ordered logistic regression. Specifically, we rank all plan years on their *ClaimsError* values and group the data into quartiles. We then re-run all analyses using a four-level dependent variable based on the *ClaimsError* quartile. All H1 and H2 inferences are identical to those based on Tables 3 and 4. We also run a logistic model with a 0/1 dependent variable and again obtain identical inferences.[34]

We also assessed the sensitivity of our main results to alternative empirical proxies. Our inferences are unchanged when *OverCompliant* is coded 1 (0 otherwise) if plans' pre-managed MLRs are (in separate tests) eight or six (rather

33. See Leone and Van Horn (2005), footnote 23. Assume that Z is reported earnings and Y is discretionary accruals. Pre-managed earnings (X) is equal to Z-Y. If Y were measured without error, then a regression of Y on Z- Y would not induce a mechanical relation because this would be a regression of Y on X. The problem arises when Y is measured with error (Y+e). In this case, Y+e is regressed on X-e—i.e., Z-Y-e—which induces a mechanical relation because of the measurement error (e). This problem is increasing in the degree of measurement error in Y.

34. The main Table 4 results also suggest that a mechanical relation is not confounding our inferences. We compute pre-managed earnings in the same manner for each health plan in the sample and then assign each plan to one of four pre-managed earnings bins. Using indicator variables for all independent variables of interest, the Table 4 results align exactly with our expectations: 1) plans in *Bin2*—i.e., those with modestly low pre-managed earnings—tend to underestimate claims; and 2) plans with *HypNoncompliant*=1 (*OverCompliant*=1) tend to overestimate (underestimate) claims. The contrasting results for *Bin2* versus *Bin1, Bin3* and *Bin4* would be unlikely if measurement error was driving a mechanical relation between the *Bin* indicator variables, which are determined by a plan's level of pre-managed earnings, and *ClaimsError*.

than 10) percentage points higher than their required MLRs. Inferences are also unchanged when we use the log of premiums to control for plan size and when equation (3) is re-estimated after dropping control variables that are insignificant in initial estimates. In our tabulated results, we cluster standard errors by issuer. Clustering by state, group or plan produces identical inferences.

Reporting higher claims estimates reduces a firm's net income, making the firm appear financially weaker than it would otherwise, which could lead to negative consequences (e.g., ratings, regulatory scrutiny). To examine whether our results are affected by firms' relative financial strength, we estimate the Table 3 and Table 4 models, including a measure of a firm's relative profitability, calculated as total net income divided by total premiums. This measure sums income and premiums across all markets shown in Figure 1 and reported on the MLR filing; i.e., Individual, Small Group, Large Group and other. Inferences are unchanged from those reported in our main tables. Inferences are also unchanged when we rank firms into quartiles based on relative profitability and estimate the models while including quartile-based indicator variables. We also estimated the Table 3 and Table 4 models using plan fixed-effects and firm fixed-effects, and all inferences are unchanged. Finally, the examination of standard regression diagnostics yields no evidence that outlying observations are affecting the results reported in Tables 3 or 4.

5.5 Economic Implications

The results in Tables 1A, 3 and 4 suggest that health plan managers overestimate claims to reduce rebate payments (H1). To provide an estimate of the economic significance of these overstatements regarding health care policy, we estimate the reduction in rebate payments for all hypothetically noncompliant plans that is attributable to plans' claims errors. We make two adjustments to reduce the likelihood of overstating the reduction in rebates driven by claims errors. First, if a hypothetically noncompliant plan's claims are overstated by an amount greater than that necessary to achieve the 80% or 85% required MLR, we use only the amount of overstatement necessary for a plan to become compliant. Second, if any year's claims are understated for a hypothetically noncompliant plan, then we net the increases in rebate payments due to such understatements against the decreases in rebate payments due to overstatements to determine the net change in rebate payments for the 2011–2013 period. As a result of these two adjustments, we provide highly conservative estimates of the rebate savings that hypothetically noncompliant plans derive from overestimating claims. Results (not tabulated) suggest that, across all hypothetically noncompliant plans, managers' claims overstatements reduced rebate payments by approximately $190 to $325 million, indicating that in the absence of managers' reporting discretion, rebates for 2011–2013 would have been 10% to 17% greater than the $1.9 billion in rebates actually paid.[35] Thus, despite the intentions of the ACA's architects, a substantial portion of

35. The $190 million estimate is computed by multiplying the claims error for each hypothetically noncompliant plan by the plan's MLR denominator and summing this amount for

the cash rebates to which health insurance policyholders are entitled, vanishes as a result of health plan managers' discretion in reporting claims.[36]

To address practical questions of interest to policymakers and researchers, we calibrate the magnitude of claims discretion for hypothetically noncompliant and over-compliant plan years. For hypothetically noncompliant plan years with claims overstatements, we scaled such overstatements by both total claims and net plan earnings (computed separately for plans reporting positive or negative earnings). For over-compliant plan years that understated claims, we scaled such understatements in an analogous manner. Lastly, for over-compliant plan years that: 1) understated claims; and 2) reported positive net plan earnings, we calculate the frequency with which the claims understatement moved the plan from negative to positive earnings.

Results of these tests (not tabulated) suggest that health plan managers' claims discretion is material in amount. For hypothetically noncompliant plan years with claims overstatements, such overstatements average 2.3% of total claims. Among plan years with positive (negative) plan earnings, these claims overstatements average 9.5% (19%) of plan pre-tax earnings. For over-compliant plans with claims understatements, such understatements average 3% of total claims. Among plan years with positive (negative) plan earnings, such understatements average 34% (14%) of plan pre-tax earnings. Lastly, we find that among over-compliant plans with both claims understatements and positive reported earnings, in 16.4% of cases, the amount of claims understatement moved the plan from negative to positive earnings. Overall, these results suggest that health plans' claims discretion is economically significant and costly to stakeholders, given that it substantially reduces policyholders' rebates and materially affects plans' reported financial performance.[37]

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all hypothetically noncompliant plans, making the two adjustments discussed in the text. The $325 million estimate is computed by multiplying the FP and NFP β_1 coefficient estimates from Table 3 by the MLR denominator amount for the hypothetically noncompliant FP and NFP plans, respectively.

36. Given that the MLR provisions themselves provide few impediments to overstating claims, it might be asked why managers do not eliminate a far greater portion of rebates. As previously noted, four factors provide such impediments: 1) the oversight of auditors, actuaries, and state insurance regulators; 2) health claims' short settlement periods that limit managers' discretion; 3) overstating claims, which reduces earnings; and 4) health plan managers lacking the authority and autonomy to respond to plan-level incentives. Note also that the three-year rolling average feature of the MLR calculation increases the complexity of managers' decisions regarding claims discretion.

37. We also assessed the magnitude of health plans' aggregate claims discretion relative to their NAIC companies' net earnings from the three markets (see Figure 1). We limited the analysis to NAIC companies reporting positive earnings from all three plan markets combined. Rolling up hypothetically noncompliant plan years' claims overstatements to the NAIC company level indicates that such overstatements average 9.6% of company-level earnings from the plan markets; the same calculation for over-compliant plan years indicates that claims understatements average 13.6% of NAIC companies' net earnings from the plan markets.

6. Conclusion

The MLR provisions provide a significant new target around which health plan managers may exercise reporting discretion. We contribute to the health care, insurance and accounting literatures by examining how the new provisions affect plan managers' claims estimates. We find that managers of health plans with pre-managed MLRs less than their required MLRs overestimate claims, thereby increasing reported MLRs and reducing or eliminating cash rebate payments. We also report strong evidence of downward discretion in claims estimates. We show that managers of health plans with ample MLR cushion underestimate claims, thereby reducing their reported MLRs while increasing plan-level earnings. Thus, despite the fact that health insurance plans reside at the lowest tier of multi-tiered organizational structures, we find that plan managers balance plan-level regulatory requirements and plan-level earnings incentives when exercising discretion over claims estimates, and such discretion materially affects plans' rebate payments and reported earnings.

Our study contributes to an emerging body of research on the ACA's MLR provisions, whose stated intent is to reduce the cost of health insurance by limiting insurers' profits and non- claims costs (e.g., perquisites). Consistent with Eastman et al.'s (2020) contemporaneous study, we show that managers exercise upward claims discretion in response to bright-line targets provided by the MLR provisions. Moreover, our study demonstrates that managers with sufficient MLR cushion exercise downward discretion over claims in response to highly salient, plan-level earnings incentives. Other research shows that noncompliant insurers in one year increase reported claims for the subsequent year to move toward MLR compliance in that following year, and insurers with ample MLRs in one year reduce subsequent-year claims, thereby reverting downward to the MLR target in the following year (Callaghan et al., 2019; Cicala et al., 2017). Collectively, these studies serve to inform policymakers charged with improving access to affordable health care and health insurance. Our study suggests that health care policymakers should consider reexamining and possibly reforming the MLR provisions in order to limit health plan managers' ability to increase MLRs (and reduce rebates) using financial reporting discretion.

Appendix

Table 1A:
Univariate Analysis of *ClaimsErrort,t+2* for Full Sample and By Tax Status

	All plans	*HypNoncompliant* plans	Compliant plans slightly above MLR standard	*OverCompliant* plans	Test statistic for differences	
		(A)	(B)	(C)	(A) vs. (B and C)	(B) vs. (C)
Panel A: Full Sample						
Mean	0.0005	0.0037	0.0008	-0.0030	5.26***	3.94***
Median	0.0002	0.0015	0.0001	0	8.30***	4.08***
% > 0	0.5306	0.6425	0.5260	0.4401	8.33***	4.85***
# of obs.	4,642	1,063	2,386	1,193		
% of obs.	100%	22.9%	51.4%	25.7%		
Panel B: For-Profit						
Mean	0.0003	0.0032	0.0007	-0.0041	5.13***	4.03***
Median	0.0003	0.0015	0.0002	0	7.26***	4.02***
% > 0	0.5404	0.6403	0.5341	0.4389	7.41***	4.62***
# of obs.	3,699	998	1,833	868		
% of obs.	100%	27.0%	49.6%	23.5%		
Panel C: Not-for-Profit						
Mean	0.0016	0.0111	0.0014	-0.0001	2.11**	0.87
Median	0	0.0022	0	0	3.79***	1.08
% > 0	0.4920	0.6769	0.4991	0.4431	3.09***	1.60
# of obs.	943	65	553	325		
% of obs.	100%	6.9%	58.6%	34.5%		

ClaimsError is the year t estimate of year t claims minus the year t+2 estimate of year t claims. *HypNoncompliant* indicates that a plan's pre-managed MLR is less than 0.80 (0.85 for Large Group); *OverCompliant* indicates that a plan's pre-managed MLR exceeds 0.90 (0.95 for Large Group).
Note: We use a two-sample t-test (mean) and Wilcoxon test (median) in testing differences across the groups and a test for differences in proportions of *ClaimsErrort,t+2* > 0 across the two groups. *p<0.10 **p<0.05 ***p<0.01 using a two-tailed test.

Table 1A displays results of t-tests and Wilcoxon tests of whether *ClaimsErrort,t+2* is associated with MLR compliance status. We first test whether the average *ClaimsErrort,t+2* for hypothetically noncompliant plans exceeds the average *ClaimsErrort,t+2* for all hypothetically compliant plans. This is a preliminary test of H1 and corresponds to the (A) vs. (B and C) comparison in Table 1A. We then test whether the average *ClaimsErrort,t+2* for plans with pre- managed MLRs substantially greater than required is less than the average *ClaimsErrort,t+2* for hypothetically compliant plans lacking such cushion in their pre-managed MLRs. This is a preliminary test of H2 and corresponds to the (B) vs. (C) comparison in Table 1A. Finally, using the same comparison groups, we test whether the proportion of plans with positive *ClaimsErrort,t+2* is consistent with H1 and H2.

The Table 1A results show that for the full sample and both sub-samples, mean and median *ClaimsErrort,t+2* for hypothetically noncompliant plans are significantly greater than the mean and median *ClaimsErrort,t+2* for hypothetically compliant plans. Five of the six comparisons are significant at p<0.01, and one comparison is significant at p<0.05. The tests of proportions yield similar conclusions. The proportion of hypothetically noncompliant plans with *ClaimsErrort,t+2* > 0 ranges from 64% to 68%; the analogous percentages for other

plans are in the 44% to 53% range, and all three (A) vs. (B and C) tests of differences in proportions are significant at p<0.01. Overall, these preliminary univariate tests of H1 are consistent with multivariate tests results.

For the full sample and FP sub-sample, all univariate tests indicate that plans with substantial pre-managed MLR cushions have a smaller average ClaimsErrort,t+2 and a greater incidence of negative ClaimsErrort,t+2 than compliant plans without such a cushion. In all six of the (B) vs. (C) comparisons for the full sample and FP sub-sample, the difference is significant at p<0.01. However, none of the univariate results in Panel C suggest that NFP plans with very high pre-managed MLRs are similarly inclined to manage their MLRs downward in order to boost profits. With the exception of the NFP plans, these preliminary univariate tests of H2 are consistent with multivariate tests results.

Table 2A:
Univariate Analysis of *ClaimsErrort,t+2* by Pre-Managed Earnings Levels

	Bin 1	*Bin 2*	*Bin 3*	*Bin 4*	Test statistic for differences *Bin2* vs. other three bins combined
Panel A: Full Sample					
Mean	-0.0022	-0.0020	-0.0001	0.0023	-2.84***
Median	0	-0.0001	0	0.0006	-3.12***
% > 0	0.4767	0.4372	0.4726	0.5746	-2.81***
# of observations	1,479	215	292	2,656	
% of observations	31.9%	4.6%	6.3%	57.9%	
Panel B: For-Profit					
Mean	-0.0031	-0.0016	-0.0001	0.0022	-1.77*
Median	0	-0.0001	0	0.0007	-2.17**
% > 0	0.4798	0.4444	0.4906	0.5834	-2.43**
# of obs.	1,140	153	212	2,194	
% of obs.	30.8%	4.1%	5.7%	59.3%	
Panel C: Not-for-Profit					
Mean	0.0010	-0.0031	-0.0002	0.0029	-2.66***
Median	0	-0.0001	0	0.0001	-2.32**
% > 0	0.4661	0.4194	0.4250	0.5325	-1.18
# of obs.	339	62	80	462	
% of obs.	35.9%	6.6%	8.5%	49.0%	

ClaimsError is the year t estimate of year t claims minus the year t+2 estimate of year t claims. Pre-managed earnings is reported earnings plus *ClaimsError*. Plans with pre-managed earnings just below and above zero are coded as *Bin2* and *Bin3,* respectively, while *Bin1* and *Bin4* (respectively) capture plans with pre-managed earnings below and above these cutoffs.
Note: We compare *Bin2* to the other three bins combined using a two-sample t-test (mean) and Wilcoxon test (median); and a test for differences in proportions of *ClaimsErrort,t+2* > 0 across the two groups. *p<0.10 **p<0.05 ***p<0.01 using a two-tailed test.

Table 2A displays results of univariate tests of the association between claims errors and pre-managed earnings. We present mean and median *ClaimsErrort,t+2* for each of the four bins, as well as the percentage of plans with positive *ClaimsErrort,t+2*. We predict that *Bin2* managers are the most likely to understate claims in order to increase earnings and avoid reporting losses. Therefore, our statistical tests compare *Bin2* to the other three bins combined. The results are consistent with *Bin2* managers understating claims. For the full sample and both sub-samples, mean and median *ClaimsErrort,t+2* are significantly smaller for *Bin2*

plans than other plans ($p<0.01$ for three tests; $p<0.05$ for two tests; and $p<0.10$ for one test). For the full sample and FP sub-sample, *Bin2* plans have a smaller percentage of positive $ClaimsErrort,t+2$ compared with other bins ($p<0.01$ and $p<0.05$, respectively). This comparison is not significant for the NFP sub- sample. Overall, the univariate results strongly suggest that plans with slightly negative pre-managed earnings underestimate claims in an effort to report positive earnings.

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