Insurance Product Pricing in Anticipation of IFRS 17*

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Abstract
We examine whether insurers alter their product pricing behavior in response to the release of International Financial Reporting Standard (IFRS) 17, which requires insurers to disclose current-value measurement for insurance contracts at a granular level. Using a difference-in-differences design and the product filings submitted by US-domiciled property-and-casualty insurers, we find that insurers from IFRS-adopting countries reduce their product prices after the release of IFRS 17 relative to insurers from non-IFRS-adopting countries. The results are concentrated among states with high financial literacy and insurers facing intense market competition, suggesting that the expected increase in market discipline drives insurers to reduce prices. Overall, we document novel evidence on the real effects of financial reporting on product pricing and provide insights into an unintended consequence of IFRS 17 on consumer welfare.

JEL Classification: G22, G28, M41

Keywords: IFRS 17; Insurance; Product pricing; Real effect

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Abstract

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1. Introduction

Insurers are financial intermediaries that perform important social and economic functions. They safeguard policyholders' assets by sharing risk and reallocate insurance premiums in the real economy by investing in financial securities such as corporate bonds (Merton, 1995; Allen and Santomero, 1997). However, financial reporting on insurance contracts has been opaque, so regulators worldwide have demanded substantial changes in financial reporting on insurance contracts over the past twenty years. On May 18, 2017, the International Accounting Standards Board (IASB) released *International Financial Reporting Standards (IFRS) 17—Insurance Contracts* (IASB, 2017). Aiming to provide relevant information about insurance contracts so investors and other financial statement users could better assess an insurer's financial positions, IFRS 17 has been the most significant change to insurance accounting in the past two decades.[1]

The key differences between IFRS 17 and the previous accounting standard, IFRS 4, center around liability valuation, profit recognition, and level of aggregation. Under IFRS 4, insurers had considerable discretion in valuing insurance contract liabilities, which comprise incurred claims and unearned revenues. More specifically, they exercised discretion in selecting which discount rate to use for valuation (for example, the rate based on the expected return on assets, the risk-free rate, or a zero rate) and were not required to update their discount rate after originating contracts (IASB, 2017). Furthermore, insurers had great discretion in timing their revenue recognition and setting their reserves for future claims (Deloitte, 2020). With its unclear requirements about insurers' level of aggregation, IFRS 4 allowed insurers to report financial performance of

[1] The new standard has been the subject of extensive debate. IASB chair Hans Hoogervorst indicated that the new standard will provide investors with better information and Financial Accounting Standards Board member Christine Botosan said that holding off on applying the new accounting "is going to harm investors, harm policyholders, and I also think it's going to harm the insurance industry." A contrasting view is that the new standard is inconsistent with the insurance business model (EFRAG, 2018) and will increase reported volatility, making the financial statements lacks informational content (Murray et al., 2004).

insurance contracts that were aggregated at the product level (for example, property or commercial auto). Regardless of the contract's origination year and underlying risk characteristics, insurers could group different insurance contracts within the same product categories for financial reporting purposes. As a result, insurers offset loss-making contracts against profitable contracts and kept their financial reporting opaque.

Under IFRS 17, insurance contracts are measured at current value, which is the present value of future cash flows from insurance contracts adjusted with current market-based information. Insurers need to conduct current-value measurement both upon originating contracts and at the end of each reporting period. IFRS 17 also requires a granular level of financial reporting for insurance contracts by putting restrictions on how insurers group different insurance contracts. Specifically, insurers can only group insurance contracts that originated in the same year and have homogeneous risk. Based on changes in current values, IFRS 17 further requires insurers to divide each portfolio into *profitable* and *onerous* contract groups and asymmetrically treat losses versus profits for each group—recognizing losses immediately and deferring recognition of profits over the contract coverage period (IASB, 2017). In sum, IFRS 17 alters financial reporting for insurance contracts by requiring current-value-based valuation, granular disclosure of insurance contracts, and timely loss recognition of onerous contracts.

While the objective of IFRS 17 is to ensure that insurers provide investors and other financial statement users with relevant information that faithfully represents insurance contracts, it is unclear ex ante whether this significant shift in financial reporting of insurance contracts has any unintended consequences. According to the 2018 Global IFRS Insurance Survey, 82% of insurers expected that IFRS 17 would impact their product design and pricing (Deloitte, 2018). In this study, we investigate whether and how IFRS 17 affects insurers' product pricing behavior.

Based on the significant changes IFRS 17 brought to financial reporting on insurance contracts, we predict that IFRS 17 can alter insurers' product pricing strategy for three reasons. First, insurers may decrease prices because of greater market discipline. The granular and current-value-based financial reporting for insurance contracts can be used by competitors to make more timely and informed market entry decisions. Specifically, competitors can identify and enter profitable product markets. Additionally, stakeholders focusing on consumer protection (for example, the media and public interest groups) may take disciplinary action against insurers that charge abnormally high prices. In anticipation of the increased market discipline, insurers have incentives to reduce prices to deter loss of market share.

Second, prices could decrease because of improved internal management. IFRS 17 requires more detailed and timely information disclosure about insurance contracts. To collect the information required by IFRS 17, insurers need to undergo a substantial change in their internal systems, including integrating the existing infrastructures related to accounting and actuarial functions. Such additional information and the improved information system can be beneficial to the insurers' overall operations. For example, a more detailed and timely accounting system for insurance contracts is not only useful for insurers to make better risk-management decisions regarding their insurance products but also can help the insurers make better investment decisions. With more effective risk-management and investment decisions, insurers are more likely and better able to pass some of the efficiency gains on to consumers in the form of lower product prices.

Last, insurers' product pricing decisions could also be affected by capital adequacy concerns because insurers are subject to a higher probability of violating capital adequacy requirements under IFRS 17 than IFRS 4. IFRS 17's aggregation level requirements limit insurers' ability to manage earnings through offsetting loss-making contracts against profitable ones. IFRS 17 also

requires immediate recognition of current-value-based losses on onerous contracts, further increasing earnings volatility. As a result, compared to IFRS 4, under which insurers had more leeway to manage earnings, IFRS 17 subjects insurers to a high probability of violating regulatory capital requirements. In anticipation of potential negative consequences driven by capital requirement violation,[2] insurers have incentives to increase earnings ex ante to improve their capital buffer and better absorb future unexpected losses. To the extent that this earnings-increasing goal can be achieved either by a price-increase or price-decrease strategy, we do not make predictions about whether the insurers increase or decrease prices.

To empirically test our hypothesis, we examine changes in insurance product prices around the release of IFRS 17, with a focus on US-domiciled property-and-casualty (P&C) insurers.[3] We exploit the release date instead of the effective date of IFRS 17 for two reasons. First, a global survey indicates that insurers have made progress towards implementation of IFRS 17 after the release date (KPMG, 2017). Our interviews with insurance practitioners and our reading of managers' discussions in annual reports also confirm that insurers started to integrate IFRS 17 into their accounting systems after the release date. Second, unlike other insurance products, such as life and health insurance, P&C insurance contracts are subject to the "full retrospective approach" under IFRS 17 and have no other options.[4] That is, P&C insurance contracts that originated before the effective date of IFRS 17 are subject to IFRS 17, making P&C insurers more likely to alter their product pricing behavior after the release date of IFRS 17.

[2] The violation of regulatory requirements on capital adequacy can cause severe regulatory costs, e.g., license non-renewal (Dembeck, 2008), or increase the probability of a rating downgrade (Ge, 2021), a key determinant of insurers' cost of capital and consumers' demand for the products.

[3] P&C insurance is economically important and accounts for more than half of premium revenues in the US insurance market (Insurance Information Institute, 2020).

[4] IFRS 17 requires an insurer to apply the requirements of IFRS 17 retrospectively unless it is impracticable to do so. Where retrospective application for a group of insurance contracts is impracticable (as is the case for long-term contracts, especially in the life-insurance business), IFRS 17 specifies two alternative transition methods: (1) the fair value approach, and (2) the modified retrospective approach (IFRS 17, paragraphs C3 to C24B).

An advantage of focusing on P&C insurance contracts is the availability of detailed and timely price information. State regulators require US P&C insurers to submit product filings when the insurers plan to change product prices, whereas many state regulators do not have such requirements for other insurance products such as life and health insurance (NAIC, 2016). The filings enable us to capture insurer-initiated product pricing decisions, rather than market-based equilibrium price, and thus identify the effects of IFRS 17 on supply-side product pricing.

Using a difference-in-differences (DiD) research design, we compare the pricing of P&C insurance contracts by US-domiciled insurers that are controlled by parent firms from IFRS-adopting countries (treatment insurers) with that by US-domiciled insurers controlled by parent firms from non-IFRS-adopting countries (benchmark insurers).[5] We use P&C insurers' markup change to capture their product pricing decisions. Unlike the final price, markup directly captures the profitability of an insurer's insurance products. Using a sample of 6,832 product filings from 2015 to 2019, we find that treatment insurers decrease prices after the release of IFRS 17 relative to benchmark insurers. The dynamic analysis shows that the observed decrease in prices occurs and persists after the release of IFRS 17, supporting the validity of the parallel-trends assumption and indicating a long-term effect on insurers' product pricing strategy. The results are robust to a variety of sensitivity tests, including alternative samples, two sets of placebo tests that use January 1, 2018 (the effective date of IFRS 9) and May 18, 2016 (one year prior to the actual release date of IFRS 17) as the pseudo release dates, and excluding the filing state, home country, or product line that constitutes a large number of our sample observations. Because changes in prices result in changes in premium revenues, we evaluate their economic significance by

[5] We use the institutional setup of parent firms' control over the operations and financial-reporting decisions of their subsidiaries. Thus, for those US-domiciled P&C insurers whose controlling parent firm is from an IFRS-adopting country, they also need to follow the IFRS 17 requirements.

calculating the changes in premium revenues. For example, for our treatment insurers, total premium revenue is $19,036 million in 2016 (one year before the release date). Our estimated change in markup translates to a $342 million reduction in total revenues.

We conduct cross-sectional analyses to examine the underlying channels. The market discipline channel suggests that the results will be stronger where product market competition is more intense and where stakeholders are better able to exert disciplinary action. Consistent with this channel, our results are concentrated among insurers facing intense market competition and located in states with high financial literacy. To examine the effect IFRS 17 has on product pricing by affecting insurers' efficiency gain and capital adequacy, we perform the analyses conditional on insurers' earnings volatility and capital ratios before the release of IFRS 17. However, we do not find supporting evidence that IFRS 17 affects product pricing through the channels of internal management and capital adequacy concerns.

We conduct several additional analyses to shed more light on the effect of IFRS 17 on insurers. First, we explore new releases of P&C insurance products, a nonpricing strategy. Having documented that treatment insurers decrease prices in response to the release of IFRS 17, we predict that treatment insurers are more likely to release new products to increase their customer base and maintain market position after the release of IFRS 17 relative to benchmark insurers. In addition, they are more likely to release new products that accommodate the requirements of IFRS 17—that is, products with short-tail risk, which reduce the uncertainty about future financial performance and regarding which current-value measurement is easier. Consistent with our prediction, treatment insurers are more likely to offer new products after the release of IFRS 17 relative to benchmark insurers, and the result is driven by new products with short-tail risk.

Second, we examine insurers' operating outcomes. We find that treatment insurers experience an increase in premium revenues and an increase in the number of policyholders at the product level but a decrease in profitability at the firm level. These results suggest that the lowered prices help treatment insurers to increase sales, as reflected in premium revenues and the number of policyholders, but the increased sales cannot fully compensate for the decreased prices and therefore result in lower profitability.

Last, using stock market response as an overall evaluation of the effect of IFRS 17, we examine the stock market reaction to the release of IFRS 17. We find lower stock market returns for the treatment insurers' ultimate parent firms around the release of IFRS 17 relative to benchmark insurers' ultimate parent firms, suggesting that investors view the release of IFRS 17 as bad news.

Our study makes three main contributions. First, we extend the literature on the real effects of financial reporting (Roychowdhury et al., 2019). This literature generally focuses on corporate investment decisions (for example, Biddle et al., 2009), and we differ by focusing on product pricing decisions. As far as we know, this is the first study examining the product pricing effect of financial reporting. Second, we extend the literature on insurance accounting. Prior accounting studies primarily examined insurers' accounting discretion and showed how discretionary provisions interact with audit oversight, firm value, and regulations (for example, Petroni et al., 2000; Beaver et al., 2003; Eastman et al., 2021). Our study extends this literature by linking insurance accounting to insurers' product pricing decisions. By documenting the important role of financial reporting in insurers' product pricing decisions, we also add to the emerging literature on supply-side frictions in the insurance product market (Koijen and Yogo, 2015; Ge, 2021). Last, our study adds to the literature on the interplay between accounting and the product market. Prior research focused on how product market competition influences firms' financial reporting and

disclosure strategies (Bernard, 2016; Shroff, 2016). Our study extends this literature by exploring another important dimension of product market—pricing, which is critically important for consumer surplus and welfare (Bergemann et al., 2015).

The paper proceeds as follows. In Section 2, we discuss the institutional background and related literature, and we develop hypotheses. Section 3 describes our sample and sets out our research design. In Section 4, we present descriptive statistics and the main empirical results. Section 5 explains the results of our additional analyses, and Section 6 reports the results of the robustness checks. Section 7 concludes.

2. Institutional Background and Hypothesis Development

2.1. Institutional Background

2.1.1. Accounting standards for insurance contracts

In 1997 the International Accounting Standards Committee (IASC) started to develop comprehensive guidance on insurance contracts. In 2001 the IASC carried the project over to the newly formed IASB. In 2005 the IASB issued IFRS 4, which provided limited guidance on measuring insurance contracts and allowed insurers to use local generally accepted accounting principles (PwC, 2017). On May 18, 2017, the IASB promulgated IFRS 17, which replaced IFRS 4 and was scheduled to become effective on January 1, 2021.[6] The IASB's chair, Hans Hoogervorst, stated that IFRS 17 is "the first truly international standard for insurance contracts" and "will bring much needed transparency in this very important part of the economy . . . contribute

[6] The Financial Accounting Standards Board has issued *Accounting Standards Update 2018–12—Financial Services—Insurance* (FASB 2018) to improve financial transparency in the insurance industry.

to financial stability" (Hoogervorst, 2017). Because of implementation challenges, the IASB has delayed the effective date of IFRS 17 twice, and the new effective date is January 1, 2023.[7]

IFRS 17 (paragraph 14) imposes the new requirement that an insurer should identify groups of insurance contracts that are subject to similar risks and report on these groups separately. This cross-sectional aggregation requirement can prevent insurers from offsetting losses from onerous contracts against profits from profitable contracts.[8] Further, IFRS 17 sets the annual-cohort requirement that contracts should not be grouped if they are written more than twelve months apart. This temporal aggregation requirement can ensure that losses on contracts written in the past cannot be offset against profits on new business or vice versa.

After defining the groups, an insurer needs to measure insurance contract liabilities at current value.[9] When originating contracts, an insurer must measure a group of insurance contracts at the total of (1) the contractual service margin (CSM), which is *unearned* profit that an insurer shall recognize as profit from the insurance contracts until it provides services in the future, and (2) fulfillment cash flows (FCFs), which comprise (i) estimates of future cash flows, (ii) discount rates that reflect the time value of money, the characteristics of the cash flows, and the liquidity characteristics of the insurance contracts, and (iii) a risk adjustment for nonfinancial risk (IFRS 17, paragraph 32). On subsequent measurement, the carrying amount of a group of insurance contracts shall be the sum of (1) the liability for remaining coverage, which comprises the CSM and the

[7] According to a Willis Towers Watson survey of 312 insurers from fifty countries, the average cost of IFRS 17 implementation ranges from $20 million to $200 million (WTW, 2021). Relatedly, an alternative explanation for our result is that insurers alter pricing to compensate for the implementation cost. However, the result of cross-sectional analysis is significant only when insurers face high market discipline, excluding this alternative explanation.
[8] IFRS 17 includes the following examples of aggregation: (i) by type of insurance contracts (for example, major product lines); (ii) by geographical area (for example, country or region); or (iii) by reportable segment (IFRS 17, paragraphs 94–96).
[9] IFRS 17 uses the term "current value" instead of "fair value" because current value is an entity-specific measurement and insurance-contract measurement is determined by the insurers' finance and actuarial systems. In contrast, fair value is a market-based measurement with the objective of estimating the price at which an orderly transaction would take place between market participants under current market conditions (IFRS 13, paragraph 2).

FCFs related to future services, and (2) the liability for incurred claims, which comprises the FCFs related to past services (IFRS 17, paragraph 40).

An insurer shall identify whether the insurance contracts result in a profit or a loss on a risk-adjusted discounted basis and then report whether the groups are (1) profitable contracts *without* a significant possibility of becoming onerous, (2) profitable contracts *with* a significant possibility of becoming onerous, or (3) onerous contracts.[10] Insurers need to asymmetrically treat losses and profits for each group by recognizing losses immediately and deferring the recognition of profits for the contract coverage period (IFRS 17, paragraph 41).

IFRS 17 generally uses the full retrospective approach at the transition date, meaning that an insurer must "identify, recognize and measure each group of insurance contracts as if IFRS 17 had always applied" (IFRS 17, paragraph C4).[11] Figure 1 displays a timeline of IFRS 17. Appendix A presents a brief introduction to IFRS 17. Panel A summarizes the accounting requirements of IFRS 17. Panels B and C show illustrative reporting examples of IFRS 17's current-value measurement and aggregation level requirements. Panel D shows excerpts from Fairfax Financial Holdings' 2016–18 annual reports, which discuss the impact of IFRS 17 and the company's preparation for the standard.

2.1.2. US insurance industry

[10] A profit (loss) indicates that on a risk-adjusted discounted basis, the premiums received from the policyholders are greater (less) than the payments made to the policyholders for claims.

[11] In certain circumstances, if and only if it is impracticable for an insurer to apply the full retrospective approach for a group of insurance contracts (for example, because historical cash flow information is unavailable), an insurer can use either the modified retrospective approach or the fair value approach on transition to IFRS 17 (IFRS 17, paragraph C5; PwC 2020; Ernst & Young 2021). However, P&C contracts are likely not eligible for the fair value approach on transitioning to IFRS 17, because P&C contracts are typically short-term contracts and so P&C contracts that are unexpired at the time of transitioning to IFRS 17 would have typically been initiated less than one year ago. As a result, historical cash flow information is more likely to be available, and retrospective tracking of the CSM is more likely to be practical, for P&C contracts. Thus, P&C contracts are likely to use the full retrospective approach on transitioning to IFRS 17.

Insurance brings social benefits by offering financial protection and risk management. It also plays a vital role in the real economy by providing long-term stable funding for investment (McKinsey, 2020). In 2020 the US insurance industry reached an unprecedented level of $1.28 trillion in net premiums written (6.11% of US GDP) and $9.7 trillion in cash holdings and invested assets (46.32% of US GDP) (Insurance Information Institute, 2020).[12] P&C insurers, which provide auto, homeowner, and commercial insurance products, accounted for the majority of the US insurance industry in 2020.[13] In 2020 the P&C insurance industry reached $652.8 billion in net premiums written, held $2.0 trillion in cash holdings and invested assets, and paid out $74.4 billion in catastrophe-related losses.

The US insurance industry is regulated in part by state insurance regulators. The interstate coordination of product, accounting, and capital standards is regulated by the National Association of Insurance Commissioners, an organization created and governed by the state insurance regulators (NAIC, 2011). In changing product prices, insurers must comply with insurance-rating laws and file their proposals with state insurance regulators through the System for Electronic Rates and Forms Filing (NAIC, 2016). The insurance-rating laws vary by state; for example, they vary in whether insurers can implement filings without regulatory approval.[14]

[12] Net premiums written and cash holdings plus invested assets accounted for 5.94% and 40.41% of real US GDP in 2020, respectively. The numbers are calculated as follows: 6.11% = 1.28 trillion / 20.94 trillion; and 46.32% = 9.7 trillion / 20.94 trillion, where $1.28 trillion is net premiums written, $9.7 trillion is the cash holdings and invested assets, and $20.94 trillion is real US GDP (source: World Bank World Development Indicators).

[13] In the US, 42.03% of insurers are P&C insurers. The number is calculated as follows: 42.03% = 2,507 / 5,965, where 2,507 is the number of P&C insurers and 5,965 is the number of total insurers.

[14] The proposal could relate to rates, rating rules, policy forms, underwriting rules, and more. The state insurance-rating laws on filing methods can be classified as (1) Prior Approval, where the rates must be filed with and approved by the state regulators before they can be used, (2) File and Use (competitive rating laws), where the rates can be used at the same time that they are filed with the regulators, (3) Use and File (competitive rating laws), where the rates can be used and subsequently filed with the regulators at a specified later date, (4) No File (open competition rating laws), where the rates can be used without filing or approval from the regulators, and (5) Flex Rating, where prior approval of rates is only required when the rate change is greater than a certain percentage (for example, 7%).

All US-domiciled insurers must file annual financial statements based on a standardized reporting format developed by the NAIC—namely, the Statutory Accounting Principles (SAP)—with the regulators in their state of domicile (NAIC, 2020). Additionally, public-listed insurers must file financial reports under IFRS if they are headquartered in the IFRS-adopting countries. In contrast, the public-listed insurers headquartered in the US must file financial reports under US Generally Accepted Accounting Principles (US GAAP). The SAP falls under the framework of GAAP but pursues different objectives. GAAP is designed for multiple users and highlights financial performance over time, whereas the SAP is designed for regulators and highlights whether an insurer can pay its claims and honor its obligations to policyholders.

Based on the SAP-based financial statements, state regulators monitor insurer solvency to ensure that insurers can fulfill all obligations to policyholders and any other legal obligations that may arise (NAIC, 2011). One important solvency metric is the risk-based capital (RBC) ratio, which is measured as total adjusted capital divided by RBC (NAIC, 2021).[15] It is important for insurers to maintain high RBC ratios. Violating the RBC-ratio solvency requirement can cause insurers to incur severe regulatory costs such as license nonrenewal (Dembeck, 2008) and can increase their probability of suffering a downgrade in their rating (Ge, 2021), which is a key determinant of insurers' cost of capital and consumers' demand for their products.

2.1.3. Insurers' rate setting and product pricing

The goal of insurers' rate-setting analysis is to set rates such that the premium charged will cover all costs while allowing them to achieve their target underwriting profit.[16] After determining the rate, the insurers calculate the premium charged as the rate multiplied by the number of

[15] Total adjusted capital is the sum of unassigned surplus, asset-valuation reserve, and 0.5×dividend liability. RBC is the statutory minimum level of capital, determined by company size and the inherent riskiness of the insurer's financial assets and operations.

[16] The price of an insurance product is typically referred to as its rate. We use "price" and "rate" interchangeably.

exposures (for example, the number of house-years for homeowner insurance products) and then adjusted by the effect of rating variables (for example, deductible factors) (Werner et al., 2016).

When an insurer submits product filings to make a rate adjustment, it needs to disclose to the regulator the overall indicated change and the overall rate impact. The overall indicated change is the percentage change from the current rate to the indicated rate, which represents the insurer's best cost-based estimated rate so that the target underwriting profit is likely to be maintained. In other words, by adjusting the current rate by the overall indicated change, an insurer can charge a premium that is expected to cover all costs (that is, the loss, loss-adjustment expense, and underwriting expense) and allow it to achieve its target underwriting profit.

However, other business considerations such as competition, marketing, legal concerns, and the impact of the rate change on customer retention will determine the final proposed rate. The overall rate impact is the percentage change from the current rate to the final proposed rate. As a result, the overall rate impact could be different from the overall indicated rate. For example, with increased competition, an insurer might decide to lower its underwriting profit to deter the entry of competitors, and hence its overall rate impact will be lower than the overall indicated change.

Appendix B provides a sample product filing by Allstate Insurance Company. The filing was submitted with a 6.9% overall rate impact and a 24.3% overall indicated change. Suppose the current rate of the insurance product is $100. The overall indicated rate implies that to maintain the same profit target for the insurance product, the insurer needs to increase the rate by $24.30. However, the insurer's overall rate impact is $6.90, indicating that the insurer adjusts its underwriting profit downward.

2.2. Related Literature

Our study is related to at least three areas in the accounting and insurance literature. First, prior research examined the effect of financial reporting on cost of capital and contracting efficiency (Armstrong et al., 2010; Beyer et al., 2010). Inspired by Bushman and Smith's (2001) call, a sizable literature has examined whether financial reporting affects corporate investment decisions, such as capital expenditures, mergers and acquisitions, and research and development (Roychowdhury et al., 2019). Our paper adds to the literature by documenting whether financial reporting affects firms' product pricing.

Second, using loss-reserve errors in the insurance industry to model discretionary accruals, one line of the earnings management literature examines how earnings management interacts with audit oversight, firm value, and regulations (for example, Petroni, 1992; Petroni et al., 2000; Beaver et al., 2003; Gaver and Paterson, 2004; Eastman et al., 2021). Another line examines whether fair value accounting on the asset side can affect insurers' financial reporting quality, as measured by the recognition timeliness of nonrecurring write-downs (Khan et al., 2019) and asset allocation (Ellul et al., 2015). In addition to insurers' financial reporting, one emerging literature in finance and economics examines how internal capital markets, financial constraints, and product market frictions affect insurers' product pricing (Koijen and Yogo, 2015; Ge, 2021). Our study differs from the above research in two ways. First, in contrast with prior research that examines accounting discretion, we focus on a significant change in financial reporting requirements for insurance contracts. Second, we examine whether and how financial reporting on insurance contracts (that is, insurers' products) can alter insurers' product pricing decisions.

A third literature investigates the effect of competition on firms' disclosure strategy (Ali et al., 2014)—that is, how firms determine their disclosure strategies to avoid product market predation or facilitate tacit collusion (Bernard, 2016; Shroff, 2016; Pawliczek et al., 2022). We extend the

literature by examining whether and how financial reporting can shape insurers' product pricing decisions.

2.3. Hypothesis Development

People buy insurance policies so an insurer will assume the financial consequences of future uncertainties. Risk pooling (that is, cross-sectional risk sharing) is fundamental to insurance because similar risks in a large pool exhibit stable and measurable characteristics that enable insurers to estimate future costs within an acceptable range of accuracy. Through the economic matching between assets and liabilities, insurers can manage the aggregate risk over time (that is, intertemporal risk sharing) and offer policyholders rates of return that are smoother over time than the insurers' investment returns (Häusler, 2003).

We develop our hypotheses based on insurers' two primary goals: regulatory compliance and product market competitiveness (Nelson, 2000). We predict that the release of IFRS 17 may alter insurers' product pricing behavior for three reasons. First, the *market discipline channel* predicts that insurers will reduce product prices if they anticipate that IFRS 17 will increase market discipline. The enhanced disclosure under the IFRS 17 regime lets outside stakeholders become more informed about insurers' pricing structure and the abnormal profits earned from each insurance contract group. For example, after identifying the insurers that report more profitable insurance contract groups, competitors may enter those markets. Additionally, stakeholders with a focus on consumer protection (for example, the media and public interest groups) may compare contract profitability across insurers and take disciplinary action against the insurers with profits above the industry average. Accordingly, anticipating that IFRS 17 will increase market discipline, insurers have incentives to reduce their product prices ex ante to avoid negative consequences such as loss of customers.

Second, the *efficiency gain channel* predicts that insurers will reduce product prices when they expect that IFRS 17 will help to improve internal risk management. To regularly update the current values of insurance contracts, insurers need to invest sufficient resources in information production and internal control systems so that they can measure insurance contracts at a granular level in a timely and reliable manner (Khan et al., 2019). This may, in turn, improve insurers' risk management (Murray et al., 2004) and help them to better match assets and liabilities along dimensions such as the duration and sensitivity to interest-rate changes and to generate greater investment returns. As such investment returns make insurers' intertemporal risk sharing more efficient, the insurers will be able to pass some of the investment returns on to consumers by decreasing product prices.

Third, the *capital requirement channel* predicts that insurers will change product prices to improve their capital adequacy. IFRS 17 requires the current-value measurement of insurance contracts and the asymmetric recognition of profit and loss at the end of each reporting period; therefore, insurers will experience an increase in earnings volatility and a downward adjustment of reported earnings, thereby increasing the likelihood of violating the RBC ratio. In addition, the aggregation level requirement reduces the cross-sectional and intertemporal offsetting of contract-level profits and losses in each product group, thereby further increasing earnings volatility. Hence, we predict that insurers likely have incentive to change their product pricing to generate higher earnings and prevent a future RBC-ratio violation. As this goal can be achieved either by increasing or decreasing prices, it is unclear whether this channel will lead to higher or lower prices. Our hypothesis follows in null form.

Hypothesis: Insurers do not change product pricing after the release of IFRS 17.

However, insurers may decide to price products so that marginal benefit equals marginal cost and allocative efficiency is optimized. That is, accounting standards may simply affect measurement and have no impact on economic fundamentals.

3. Sample and Research Design

3.1. Sample

Our data set begins with all US product filings submitted during the period January 1, 2015, to December 31, 2019. We extract the filings from the S&P Global Market Intelligence Insurance Product Filings database. To focus on insurers' product pricing, we exclude filings that do not involve rate changes.[17] Next, we exclude potentially erroneous filings with submission dates earlier than the last revision date, with missing values of rate changes, or with negative or missing values of gross written premium. We obtain financial performance data from insurers' statutory filings as compiled by S&P Global Market Intelligence Insurance Statutory Financials and retain data on insurers with a stock ownership structure.[18] Following Ellul et al. (2015), we exclude observations with RBC ratios below 200% or above 2,000%.[19] Finally, to ensure that the treatment sample is subject to IFRS adoption, we exclude treatment insurers whose parent firms do not issue securities that trade in a regulated market.[20] The final full sample includes 224,324 filings, consisting of 56,741 filings by treatment insurers (treatment filings) and 167,583 filings by benchmark insurers (benchmark filings). Because insurers are subject to state-level regulations and product-specific industry dynamics, we construct a matched sample to reduce the differences between the treatment and benchmark filings. Specifically, we construct a matched sample with

[17] Insurance product filings typically comprise rate, rule, and form filings.
[18] Compared with stock ownership structures, mutual ownership structures can create different incentives that impact earnings management and reserve decisions (Mayers et al., 1997; Cummins et al., 1999; Beaver et al., 2003).
[19] Insurers with an RBC ratio below 200% are subject to supervisory intervention, whereas those with an RBC ratio above 2,000% are unusual and may behave differently from ordinary firms (Ellul et al., 2015).
[20] As a robustness check, we add back the private treatment insurers to the sample and find the results still hold.

replacement by matching each treatment filing to a benchmark filing, according to the filing state, product type, filing year-month, and insurer characteristics (that is, lagged quintile *ROA*, lagged quintile *Size*, lagged quintile *RBC Ratio*, and the closest *ROA*).[21] The matched sample consists of 6,832 filings from January 1, 2015, to December 31, 2019.[22]

Table 1, Panel A shows the sample selection process. Table 1, Panel B provides the distribution of the matched sample by year-quarter, indicating that the number of observations does not vary dramatically between years or show an obvious time trend. Table 1, Panel C provides the distribution by home country (the countries where insurers' ultimate parent firms are headquartered). This panel shows that the treatment sample comprises 3,461 filings from eleven IFRS-adopting countries and the benchmark sample comprises 3,371 filings from non-IFRS-adopting countries. The numbers of treatment and benchmark filings are different because we conduct matching with replacement (so control units can be matched to multiple treated units).[23] Among the treatment sample, insurers from Switzerland have the most product filings (877), followed by Japan (752), Canada (705), and Australia (332). Figure 2 shows the distribution by US filing state (the states in which insurers are domiciled and regulated). Overall, our sample is geographically dispersed, which helps ensure our findings are generalizable.

Table 1, Panel D reports the mean differences between the treatment filings and the matched benchmark filings. Consistent with the matching procedure being reasonably effective, the

[21] The definition of insurance product type is based on the SERFF Type of Insurance, which includes thirty-five P&C insurance product types, such as property, crop, and commercial auto (NAIC, 2021).

[22] The number of observations decreases from 224,324 (full sample) to 6,832 (matched sample). We explore the reason for the decreased sample size by dropping one matching criterion one at a time. We find that quintile *Size* is the most influential criterion, followed by quintile *RBC Ratio,* quintile *ROA,* product type, and filing state. To ensure robustness, we rerun the regression model using the full sample (Panel B of Table 3); an alternative sample only matched by filing state, product type, and filing year-month (untabulated); and an alternative sample based on a different matching method (Table 8). The results are robust to the different samples.

[23] As a robustness check, the results remain unchanged when we match without replacement (each control unit is matched to only one treated unit).

differences in all insurer characteristics are statistically significant in the pre-match sample and are not significant in the post-match sample.

3.2. Measuring Insurers' Product Pricing Decisions

Markup—that is, the price spread between the selling price and the cost of a product—has been one central question in economics (for example, Fresard, 2010; Koijen and Yogo, 2015; Dou and Ji, 2021). Because the cost of risk sharing keeps changing (for example, the future claim costs), we evaluate insurers' product pricing decisions using markup instead of final price. We construct the change in markup (Δ*Markup*), measured as the difference between the overall rate impact and the overall indicated change. As discussed in Section 2, the overall indicated change is meant to adjust the rate so that the premium can cover all costs while the company achieves target underwriting profit, whereas the overall rate impact may deviate from overall indicated change due to management considerations. Thus, the difference can capture the change in underwriting profit for the specific product, which is conceptually equivalent to the change in markup.[24] An increase (decrease) in Δ*Markup* suggests that insurers add more (less) underwriting profit to the total costs of an insurance product.

We use the sample product filing in Appendix B to illustrate our variable measurement. Given that Allstate Insurance Company submitted a filing for a 24.3% overall indicated change and a 6.9% overall rate impact, the variable Δ*Markup* for this filing observation is −17.4%—that is, (100%+6.9%)−(100%+24.3%).

3.3. Research Design

[24] We thank the National Association of Insurance Commissioners' Research & Actuarial Team for discussions on markup measurement. The existing target underwriting profit included in the estimation of overall indicated change is disclosed in the product filings, but the new underwriting profit included in the estimation of overall rate impact is not. Therefore, the difference between the overall rate impact and the overall indicated change becomes the closest estimate of markup changes we can get when using the information disclosed in the product filings.

To test our hypothesis, we employ a DiD design. We compare the change in prices around the release of IFRS 17 among US P&C insurers that are ultimately controlled by parent firms from IFRS-adopting countries (treatment insurers) with the corresponding change among US P&C insurers ultimately controlled by parent firms from non-IFRS-adopting countries (benchmark insurers). Our regression model is the following:

$$\Delta Markup_{i,p,d} = \beta_0 + \beta_1 Post_{i,p,d} \times Treat_{i,p,d} + \beta_j Controls_{i,q-1} + \delta_{i,p} + \eta_{p,s,m} + \varepsilon_{i,p,d} \quad (1)$$

The outcome variable $\Delta Markup$ is the difference between the overall rate impact and the overall indicated change of the product filing submitted by insurer *i* for product *p* on the submission date *d*; *Post* is an indicator variable that equals 1 if the filing is submitted in the period after the release of IFRS 17, and 0 otherwise; *Treat* is an indicator variable that equals 1 if the insurer is ultimately controlled by a parent firm from a country that requires IFRS adoption, and 0 otherwise. Following prior research (Koijen and Yogo, 2015; Ge, 2021), we control for a set of insurer characteristics for insurer *i* in the quarter prior to the submission date *q−1*, including *Size* (natural logarithm of one plus total assets), *RBC Ratio* (risk-based capital ratio), *ROA* (net income divided by average total assets), and *Reinsurance* (reinsurance liabilities divided by total assets).

We also include insurer-product fixed effects, $\delta_{i,p}$, and product-state-year-month fixed effects, $\eta_{p,s,m}$, to control for time-invariant insurer-product-specific pricing factors and time-varying local regulatory/economic factors. The inclusion of product-state-year-month fixed effects can also help control for demand-side changes to isolate supply-side pricing responses. We suppress the two indicator variables, *Treat* and *Post*, because they are subsumed by insurer-product fixed effects

and product-state-year-month fixed effects, respectively. We adjust the standard errors by clustering at the insurer level.

3.4. Discussion of the Empirical Validity

While we selected the IFRS 17 release as the shock for our DiD analysis, it is crucial to ensure the underlying assumptions are true: (1) the release is an exogenous information shock to insurers; (2) there are no concurrent events surrounding the release; and (3) the insurers have incentives to alter pricing in response to the release. To address these concerns, we manually read the news on Factiva with the keywords "IFRS 17" and "insurance" during the prerelease period, on the release month, and during the post-release period. We find that no actions were taken by insurers before the release, no other insurance-related news surrounded the release, and the amount of news covering how managers responded to IFRS 17 increased after the release.[25]

Furthermore, Appendix A, Panel D provides excerpts from the 2016–18 annual reports of Fairfax Financial Holdings, the ultimate parent firm of one of our treatment insurers. The reports indicate that IFRS 17 takes the *retrospective* approach and acknowledge that the company commenced assessments of the impact of IFRS 17 on its consolidated financial statements in 2017,

[25] We use Factiva to search for IFRS 17 news released during the one-year window around May 18, 2017 (the release date of IFRS 17). We find no news during the period May 2016 to February 2017. Regarding the period February 2017 to May 18, 2017, we find some news discussing the impact of IFRS 17 but no news on the actions taken by insurers. For example, a news release on February 23, 2017, said, "The IASB currently expects to publish IFRS 17 'Insurance Contracts' during the first half of 2017 and that the latest adoption date for the new standard will be 2021" (Regulatory News Service, 2021). Regarding the period on and after May 18, 2017, we find more news about insurers' actions in response to IFRS 17. For example, on July 1, 2017, the news indicates that "after the introduction of IFRS 17 . . . insurance companies are either undertaking this process in-house or have appointed external consulting companies to assist in the building of IFRS 17 reporting. Actuarial modelling software is being used to efficiently perform various tasks such as financial estimation, pricing, calculating embedded value and risk management" (Asia Insurance Review, 2017). In addition, according to Alex Bertolotti, a PricewaterhouseCoopers partner specializing in IFRS 17, "most companies are rolling up their sleeves and getting on with IFRS 17 . . . All of our big clients around the world are either doing an impact assessment or have moved into implementation." One news report from December 19, 2017, indicates that "while a number of insurers are not happy, they are looking to deal with the standard" (SNL European Financials Daily, 2017). Finally, a KPMG survey of eighty-two insurance executives around the world found that only 5% of insurers were expecting to implement IFRS 17 after January 1, 2021 (KPMG, 2017).

confirming that insurers responded to IFRS 17 after the release of IFRS 17. Finally, we also contact insurers, and the response indicates that they started to integrate IFRS 17 into their financial, pricing, and operation systems after the release of IFRS 17. In sum, the media release, the annual report, and our interviews with insurance practitioners confirm the empirical validity of selecting the release of IFRS 17 as the event date for our DiD design.

4. Empirical Analysis

4.1. Descriptive Statistics

Table 2 presents summary statistics for the variables in our main analysis. We winsorize all continuous variables at the top and bottom 1% of their distributions to mitigate the effect of outliers. Table 2, Panel A shows that the mean and median values of $\Delta Markup$ are −2.002 and 0.000, suggesting that our sample insurers tend to reduce or maintain their prices surrounding the release of IFRS 17. The standard deviation of $\Delta Markup$ is 8.254, indicating high variation in insurers' product pricing changes. Further, the mean and median values of total assets are $4,321 million and $1,317 million. Because the distribution is highly skewed, we use the natural logarithm of total assets to capture insurer size in our regression.

Table 2, Panel B reports the Pearson correlation coefficients. The association is positive, but statistically insignificant, between the indicator variable capturing whether the filing is submitted in the post-period (*Post*) and the variable capturing the change in price ($\Delta Markup$). The indicator variable capturing whether the insurer is subject to IFRS 17 (*Treat*) is statistically significant and negatively associated with the change in prices.

4.2. IFRS 17 and Insurance Product Pricing

Table 3, Panel A presents the results of testing our hypothesis. One by one, we include product-insurer-product fixed effects, state-year-month fixed effects, and a set of control variables in

columns (1) to (4) to ensure the robustness of our findings. We first find that the coefficient on *Post* × *Treat* is negative and statistically significant after including the insurer-product fixed effects and the state-year-month fixed effects (columns [1] and [2], respectively). The finding suggests that treatment insurers experience a decrease in prices after the release of IFRS 17. After including both sets of fixed effects, we continue to find similar results without and with control variables (columns [3] and 4], respectively). The results are also economically significant. Based on the estimation results in column (4) and the total written premium by all the treatment insurers in 2016, net premiums written decrease by $342 million for US P&C insurers subsequent to the release of IFRS 17.[26]

Table 3, Panel B reports the results of our robustness checks. We first conduct a multiperiod dynamic analysis to assess the validity of the parallel-trends assumption underlying our DiD analysis (Bertrand and Mullainathan, 2003). To do this, we first replace *Post* × *Treat* in Eq. (1) with the following interaction variables: *Pre1* × *Treat*; *Post0* × *Treat*; *Post1* × *Treat*; and *Post2*+ × *Treat*. Here, *Pre1* is an indicator variable that equals 1 for filings submitted one quarter prior to the release of IFRS 17 and 0 otherwise, and *Post0*, *Post1*, and *Post2*+ are indicator variables that equal 1 for filings submitted in the quarter of, one quarter after, and two or more quarters after the IFRS 17 release, respectively, and 0 otherwise. Column (1) reports results for the dynamic analysis. Consistently with the parallel-trends assumption, the coefficients on *Pre1* × *Treat* and *Post0* × *Treat* are not statistically significant. That is, there is no indication that the trends in price changes differ systematically between the treatment and benchmark insurers before and during the release quarter of IFRS 17. Further, the significantly negative coefficients on *Post1*

[26] −341.885 = −1.796% × 19035.911, where −1.796 is β_1 in column (4) of Table 3, Panel A and $19,035.911 million is the total rate-filing written premiums for the treatment US P&C insurers in our full sample in 2016.

× *Treat* and *Post2*+ × *Treat* suggest that the observed decrease in prices occurs after the release of IFRS 17 , lending further support to the validity of the parallel-trends assumption.

Next, we conduct two sets of placebo tests. We re-estimate Eq. (1) using (i) a sample of pre-release filings with May 18, 2016, one year prior to the actual IFRS 17 release date, as a pseudo release date (N = 2,739); and (ii) a sample of post-release observations with January 1, 2018, the effective date of IFRS 9, as a pseudo release date (N = 3,913). As shown in columns (2) and (3), we find no statistically significant change in prices after either of the pseudo release dates. Finally, we repeat our analysis using the full sample (N = 224,324). Column (4) shows that the coefficient on *Post* × *Treat* continues to be negative and statistically significant.

In sum, the results in Table 3 indicate that insurers reduce prices in response to the release of IFRS 17. Further, the observed decrease in prices occurs only after the release of IFRS 17, suggesting that our baseline finding is unlikely to be driven by pre-existing time trends or other concurrent accounting standards.

4.3. Channel Analysis

In this section, we explore the channels through which the release of IFRS 17 influences insurance product pricing. We begin our analysis by examining whether the observed decrease in prices is driven by the market discipline channel. Given that insurers are allowed to sell insurance products only in the filing states, the insurers in states with intense competition are more likely to take actions to maintain their product market competitiveness. We predict that the effect of IFRS 17 on insurance product pricing is more pronounced among insurers from states with more intense competition. Further, the stakeholders with a focus on consumer protection pay more attention to the insurance products sold in the same states. We use the average level of financial literacy in a state to proxy for the degree to which an insurer would be subject to the disciplining

effect from a variety of stakeholders (for example, the media and public interest groups). Correspondingly, we predict that the effect should be stronger when insurers are domiciled in states with higher financial literacy.

To explore this channel, we perform analyses conditional on the strength of product market competition and financial literacy. We construct a variable to capture state-level industry competition: *HHI*, the sum of the squared market share of each insurer in the same filing state, with lower values indicating a more competitive marketplace. And using survey data from the National Financial Capability Study, we construct an index, *Fina Literacy*, to capture stakeholders' financial literacy. The index is measured as the average value of all responses to relevant test questions in the survey for each state, where each response has a value of 1 if the answer is correct and 0 otherwise.[27]

Panel A of Table 4 shows that the mean and median values of *HHI* are 1166.978 and 1082.689, respectively, and those of *Fina Literacy* are 1.785 and 1.788, respectively. Based on the median value of *HHI* (*Fina Literacy*), we construct two subsamples of insurers with high and low *HHI* (*Fina Literacy*) based on the variables' respective median values as of the quarter prior to the release of IFRS 17.

Panel B of Table 4 shows that the coefficient on *Post* × *Treat* is not statistically significant among insurers with high *HHI* (columns [1] and [3]) and is negative and statistically significant

[27] The data set provides respondent-level data on the US for 2018, 2015, 2012, and 2009. Because our sample period runs from 2015 to 2019, we use the index from Survey III (data for 2015) for the period 2015 to 2017 and the index from Survey IV (data for 2018) for the period 2018 to 2019. Following prior research (Lusardi and Mitchell, 2011), we measure the variable *Fina Literacy* based on three survey questions: (1) "Suppose you had $100 in a savings account and the interest rate was 2% per year. After 5 years, how much do you think you would have in the account if you left the money to grow? (a) More than $102, (b) Exactly $102, (c) Less than $102, (d) Don't know, (e) Prefer not to say." (2) "Imagine that the interest rate on your savings account was 1% per year and inflation was 2% per year. After 1 year, how much would you be able to buy with the money in this account? (a) More than today, (b) Exactly the same, (c) Less than today, (d) Don't know, (e) Prefer not to say." (3) "Buying a single company's stock usually provides a safer return than a stock mutual fund. (a) True, (b) False, (c) Don't know, (d) Prefer not to say."

among insurers with low *HHI* (columns [2] and [4]) before and after including control variables. The results indicate that the observed decrease in prices after the release of IFRS 17 is concentrated among insurers facing intense competition. In Panel C of Table 4, we find that the coefficient on *Post* × *Treat* is negative and statistically significant among insurers located in states with high *Fina Literacy* (columns [1] and [3]) and is not statistically significant among insurers located in states with low *Fina Literacy* (columns [2] and [4]) before and after including control variables. The results suggest that insurers reduce prices when the states in which they sell insurance products have a larger proportion of stakeholders with high financial literacy.[28] Consistently with the market discipline channel, IFRS 17 incentivizes insurers to reduce profit margins to avoid market discipline and maintain their product market competitiveness.

Next, we explore the channel of efficiency gains. To the extent that the IFRS 17 release leads to improved internal risk-management performance, the effect should be more pronounced among insurers with poor pre-release risk-management performance. To capture insurers' risk-management performance, we construct a variable, *Volatility*, representing the standard deviation of *ROA* over the five-quarter period from quarter $q-4$ to quarter q. We then split the sample into two subsamples of insurers with high and low *Volatility*, based on the variable's median values as of the quarter prior to the release of IFRS 17.

In Panel A of Table 4, the median value of *Volatility* is 0.005. In Panel D of Table 4, the coefficient on *Post* × *Treat* is not statistically significant among insurers with high *Volatility* (column [1]) and is negative and statistically significant among insurers with low *Volatility* (column [2]) before including the control variables. However, the coefficient on *Post* × *Treat* is

[28] Note, however, that IFRS 17 has not yet been implemented, and thus the enhanced disclosures of insurance contracts are not yet publicly available. Thus, our finding captures insurers' *ex ante* response in anticipation of IFRS 17's effect on transparency.

statistically insignificant in both subsamples after including the control variables (columns [3] and [4]). The results do not lend support to the efficiency gain channel, suggesting that the change in risk-management performance is not the primary channel through which the IFRS 17 release affects insurance product pricing.

Finally, we explore the capital requirement channel. Because insurers are more likely to change their product pricing when they have greater capital adequacy concerns, we predict that the impact of the IFRS 17 release on prices is stronger among insurers with less capital adequacy. To test this prediction, we use *RBC Ratio* to proxy for capital adequacy, with a lower ratio indicating less capital adequacy. We then rerun our analysis after partitioning the sample into two subsamples of insurers with high and low *RBC Ratio*, based on the variable's median values as of the quarter prior to the release of IFRS 17.

As reported in Panel A of Table 4, the median value of *RBC Ratio* is 455.560. In Panel E of Table 4, the coefficient on *Post* × *Treat* is negative and statistically significant among insurers with high *RBC Ratio* (columns [1] and [3]) and is not statistically significant among insurers with low *RBC Ratio* (columns [2] and [4]) before and after including control variables. This finding is inconsistent with the prediction of the capital requirement channel, suggesting that the effect of IFRS 17 on prices is concentrated among insurers with higher capital adequacy, which have less incentive to change product pricing to raise capital.

In sum, the evidence in Table 4 does not support the capital requirement channel nor the efficiency gain channel. Rather, it lends strong support to the market discipline channel, in which IFRS 17 incentivizes insurers to mark down prices ex ante in response to expected enhanced product market competition and stakeholder discipline.

5. Additional Analyses

Our findings so far show that insurers reduce prices in response to the release of IFRS 17. In this section, we further investigate new product release as an alternative nonpricing strategy. We then examine the effect of IFRS 17 on product revenue and insurer profitability. Finally, we discuss the implications of IFRS 17 for shareholder values.

5.1. Evidence on Nonpricing Strategy

We examine whether insurers exploit nonpricing strategies to compensate for their price decrease and the intensified market competition. Specifically, we predict that P&C insurers may launch new products to attract potential consumers and increase their market share in anticipation of IFRS 17. We also explore whether the impact of IFRS 17 on the decision to introduce new product lines differs depending on the characteristics of new products. Our expectation is that insurers are more likely to introduce short-tail lines because such products make current-value measurement easier and reduce uncertainty about future financial performance. To this end, we separately examine the effect for long-tail and short-tail lines.

To test our predictions, we construct an indicator variable, *New Product*, that equals 1 if the rate filing is filed to develop a new product and 0 if the rate filing is filed to modify the rate of an existing product. Following Nelson (2000), we classify the products as long-tail lines if the insurance product is Homeowners/Farm-Owners Multiple-Peril, Private Auto Liability, Commercial Auto Liability, Commercial Multiple-Peril, Other Liability, or Medical Malpractice, and as short-tail lines otherwise.[29] We replace the dependent variable in Eq. (1) with *New Product* and estimate Eq. (1) using a linear probability model (LPM) because our model includes many

[29] Other Liability is the type of coverage that protects the insured against legal liability resulting from negligence, carelessness, or failure to act that causes property damage or personal injury to others. Directors and officers (D&O) coverage, environmental-pollution liability, liquor liability, employment-practices liability, and insurance for daycare centers, veterinarians, and elevators and escalators are considered Other Liability policies (NAIC, 2017).

fixed effects and a nonlinear model could suffer from incidental-parameters problems (Wooldridge, 2010). Because there is no new product release in our matched sample, we estimate the regression using the full sample.

Panel A of Table 5 shows that the mean and median values of *New Product* are 0.046% and 0.000%, respectively, indicating that the majority of product filings are filed to revise the product pricing of existing products rather than to introduce new product lines. For both long- and short-tail lines, the mean and median values of *New Product* are 0.023% and 0.000%, respectively. In Panel B of Table 5, in which *New Product* is the dependent variable, we find that the coefficient on *Post* × *Treat* is positive and statistically significant (columns [1] and [2]) before and after including control variables, suggesting that treatment insurers are more likely to release new products after the IFRS 17 release. Consistently with our prediction, we find that the coefficient on *Post* × *Treat* is not statistically significant when the new products are long-tail lines (column [3]), while the same coefficient is positive and statistically significant when the new products are short-tail lines (column [4]).

In sum, we find that, in addition to motivating the pricing strategy of reducing prices, the release of IFRS 17 also incentivizes insurers to engage in a nonpricing strategy by releasing new products, especially short-tail lines.

5.2. Evidence on Insurer Operating Outcomes

Having documented a decrease in prices, a natural question is whether the release of IFRS 17 leads to a change in product revenue and insurer profitability. On the one hand, insurers' low-price strategy may increase consumer demand and therefore boost product revenue and insurer profitability. On the other hand, the increased number of insurance products sold might not fully compensate for the reduction in prices, reducing financial performance.

For empirical tests, we construct two filing-level variables, *Premium* and *Policies*, to explore the product revenue effect and two insurer-level variables, *ROA* and *ROE*, to investigate the insurer profitability effect. *Premium* (*Policies*) is defined as the natural logarithm of one plus the product-specific statewide premiums (the number of product-specific statewide policyholders affected). *ROA* (*ROE*) is measured as net income divided by average total assets (equities). We acknowledge a limitation of this test: the filing-level variables only capture insurers' estimate rather than the actual changes in product-specific operating outcomes. Thus, it is important to use insurer-level profitability variables to evaluate the actual changes in operating outcomes.

Panels A and B of Table 6 report the descriptive statistics. The results show that that the mean and median values of *Premium* (*Policies*) are 7.054 and 8.987 (2.255 and 0.693) and those of *ROA* (*ROE*) are 0.005 and 0.006 (0.015 and 0.014), respectively. Panels C and D of Table 6 show the regression results. In Panel C, we find that the coefficients on *Post* × *Treat* are positive and statistically significant when the dependent variables are *Premium* (columns [1] and [2]) and *Policies* (columns [3] and [4]) before and after including control variables. The results suggest that the pricing policy after the IFRS 17 release (that is, reducing prices) is associated with an increase in both premium revenue and number of policyholders. Next, in Panel D, we find that the coefficient on *Post* × *Treat* is negative and statistically significant when the dependent variable is *ROA* (columns [1] and [2]) or *ROE* (columns [3] and [4]). The results indicate that the IFRS 17 release reduces insurer profitability. Collectively, the findings in Table 6 suggest that the low-price strategy is associated with high price elasticity, but the increased quantity cannot fully compensate for the decreased prices.

5.3. Evidence on Shareholder Values

While our main analysis shows one unintended consequence of IFRS 17 for product prices, the objective of IFRS 17 is to bring benefits to investors by helping them assess insurers' financial positions. Thus, we examine the aggregate effect of IFRS 17 on shareholder value. We predict that transparency may lower information asymmetry and cause a positive market reaction. However, the reduction in prices and the increased compliance costs may exceed the transparency benefits, leading to a negative market reaction. Therefore, it is an empirical question whether IFRS 17 can fulfill the standard setters' objective.

We focus on the release date of the IFRS 17 to test for different short-window market reactions between the US-domiciled P&C insurers' ultimate parent firms from IFRS-adopting countries (treatment parent firms) and the ultimate parent firms from non-IFRS-adopting countries (benchmark parent firms).[30] We retrieve the stock-return data for the insurers' ultimate parent firms from the S&P Global Market Intelligence Insurance Statutory Financials, the market-returns data from Datastream, and the financial-information data from Worldscope. We restrict the sample to the insurance industry by excluding parent firms in industries such as banking and asset management. To conduct this analysis, we examine the cumulative abnormal returns (*CAR*) during the three-day event window from May 17 to 19, 2017. Abnormal return is calculated as actual return minus expected return based on the market model estimated over the period [−150, −30] trading days. We regress $CAR[-1,+1]_{Parent}$ on an indicator variable that equals 1 if the parent firm is from a country that requires IFRS adoption ($Treat_{Parent}$) and 0 otherwise. We include $Size_{Parent}$, $TobinQ_{Parent}$, and $Leverage_{Parent}$ as control variables (Fishman, Hamao, and Wang 2014) and cluster the standard errors at the country level.

[30] The S&P Global Market Intelligence Insurance Statutory Financials provides information on the identification of insurers' parent firms and ultimate parent firms. We find that all sample insurers are public listed at (ultimate) parent firm level rather than at individual insurer level. As a result, we merge our sample insurers with the stock data of their ultimate parent firms for market reaction analysis.

Panel A of Table 7 shows that the average $CAR[-1,+1]_{Parent}$ is −0.332 % (0.901%) for the treatment (benchmark) parent firms. We also examine the cumulative abnormal returns during a placebo window that begins five trading days before the announcement and ends two days before the announcement, $CAR[-5,-2]_{Parent}$. We find an average $CAR[-5,-2]_{Parent}$ of −2.252% (−1.156 %) for the treatment (benchmark) parent firms.

Panel B of Table 7 shows that the coefficient on $Treat_{Parent}$ is negative and statistically significant when the dependent variable is $CAR[-1,+1]_{Parent}$ (columns [1] and [2]), suggesting that investors view the IFRS 17 release as bad news. We further find that the coefficient on $Treat_{Parent}$ is statistically insignificant when the dependent variable is $CAR[-5,-2]_{Parent}$ (columns [3] and [4]), indicating no differential market reaction for treatment parent firms during this window. Overall, these findings are consistent with the notion that investors anticipate decreased shareholder wealth associated with the IFRS 17 adoption at the time of its release.

6. Sensitivity Tests

We conduct a series of sensitivity tests to check the robustness of our main results. Specifically, we test whether our results are sensitive to excluding influential observations, the use of alternative samples and measures, and filing methods and statuses. We report the results in Panels A, B, and C, respectively, in Table 8.

6.1. Excluding Influential Observations

First, we repeat our analysis three times after excluding (i) filings issued by insurers from Texas, which is the filing state with the most sample filings; (ii) filings issued by insurers ultimately controlled by parent firms in Switzerland, which is the home country with the most sample treatment insurers; and (iii) filings issued for the Other Liability product line, which

accounts for many of our sample filings. Table 8, Panel A shows that our results still hold (columns [1]–[3]).

6.2. Using Alternative Samples and Measures

To check the robustness of our results to alternative sample constructions, we repeat our analysis using (i) the matched sample after excluding the quarter of IFRS 17 release (that is, 2017Q2) from our sample (N = 6,225) and (ii) the matched sample with one-to-N quintile matching based on filing state, product type, year-month, lagged quintile *ROA*, lagged quintile *Size*, and lagged quintile *RBC Ratio* (N = 7,353). The results are presented in Table 8, Panel B. Our results remain unaltered (columns [1] and [2]).

We check whether insurers' pricing decisions differ systematically when the insurers increase or decrease their prices. To this end, we replace the dependent variable in Eq. (1) with two alternative variables: (i) *Decrease*, an indicator variable that equals 1 if the change in prices is negative and 0 otherwise; and (ii) *Increase*, an indicator variable that equals 1 if the change in prices is positive and 0 otherwise. We then estimate the regressions using an LPM and present the estimated results in columns (3) and (4) of Table 8, Panel B. We find that the coefficient on *Post* × *Treat* is positive and statistically significant when the dependent variable is *Decrease* (column [3]), while it is insignificant when the dependent variable is *Increase* (column [4]). This finding suggests that insurers are more likely to adjust product prices downward after the release of IFRS 17 and lend further support to our baseline inference that IFRS 17 leads insurers to reduce product prices.

6.3. Using Alternative Filing Methods and Filing Status

State regulators monitor P&C product rates through two methods: (i) the filings method, in which insurers apply for rate changes; and (ii) the filing status, in which regulators approve or

terminate the filings after insurers submit application. We expect that our findings are stronger when the filings method is less restrictive, allowing insurers to respond quickly to the release of IFRS 17. In a related vein, we explore whether the pricing effect of IFRS 17 eventually comes into force. Correspondingly, we expect the effect of IFRS 17 on insurance product prices to be greater for ongoing filings than for filings terminated by the state regulators.

For empirical tests, we conduct two sets of analyses and report the results in Panel C. We find that the coefficient on *Post* × *Treat* is not statistically significant among states with approval-based filing methods (column [1]) and is negative and statistically significant among states with competitive filing methods (column [2]).[31] Additionally, the coefficient on *Post* × *Treat* is negative and statistically significant among filings with ongoing status (column [3]) and is not statistically significant among filings with terminated status (column [4]). These findings suggest that insurers reduce prices when the local rating laws regarding filing methods are less stringent and that the pricing effect of IFRS 17 comes into effect in the insurance product market.

7. Conclusion

We find that the IFRS 17 release leads to a decrease in insurance prices, and the results are driven by insurers facing intense market competition and located in states with high financial literacy. The results indicate that the expected increase in market discipline incentivizes insurers to change their product pricing decisions. We further find that insurers tend to launch new products, a nonpricing strategy, in response to the IFRS 17 release. Finally, IFRS 17 reduces insurers' overall profitability and shareholder value.

[31] Specifically, the competitive filing methods include "File and Use" and "Use and File," while approval-based filing methods include "Prior Approval" and "Review and Approval." The ongoing status includes approved and pending filings, while the terminated status includes disapproved and withdrawn filings.

Overall, we document novel evidence on the real effects of IFRS 17 in the product market and provide implications of IFRS 17 for consumer welfare. We acknowledge that our results may only speak to the effect of IFRS 17 on product pricing in the P&C insurance industry. Future research may investigate the impact of financial reporting on other insurance products, explore alternative nonpricing strategies, and examine the long-term effect of IFRS 17 on financial stability in the context of capital allocation and risk sharing in financial markets.

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Appendix A: Accounting standards and illustrative examples

This appendix presents a summary of accounting standards for insurance contracts. Panel A shows the key requirements of IFRS 17. Panels B and C show illustrative reporting examples for current-value measurement and aggregation-level requirement, respectively. Panel D shows excerpts from Fairfax's 2016–2018 annual reports.

Panel A: Summary of International Financial Reporting Standards (IFRS)

IFRS 17 insurance contracts	
Introduction 4	The previous IFRS Standard on insurance contracts, IFRS 4, was an interim standard that allowed entities to use a wide variety of accounting practices for insurance contracts, reflecting national accounting requirements and variations of those requirements . . . Some previous insurance accounting practices permitted under IFRS 4 did not adequately reflect the true underlying financial positions or the financial performance of these insurance contracts. To address these issues, the International Accounting Standards Board (the Board) undertook a project to make insurers' financial statements more useful and insurance accounting practices consistent across jurisdictions.
Paragraph 14	Level of aggregation of insurance contracts An entity shall identify portfolios of insurance contracts. A portfolio comprises contracts subject to similar risks and managed together. Contracts within a product line would be expected to have similar risks and hence would be expected to be in the same portfolio if they are managed together . . .
Paragraph 32	Measurement on initial recognition (paragraphs B36–B95) On initial recognition, an entity shall measure a group of insurance contracts at the total of: (a) the fulfillment cash flows, which comprise: (i) estimates of future cash flows (paragraphs 33–35); (ii) an adjustment to reflect the time value of money and the financial risks related to the future cash flows, to the extent that the financial risks are not included in the estimates of the future cash flows (paragraph 36); and (iii) a risk adjustment for nonfinancial risk (paragraph 37). (b) the contractual service margin, measured applying paragraphs 38–39.
Paragraph 40	Subsequent measurement The carrying amount of a group of insurance contracts at the end of each reporting period shall be the sum of: (a) the liability for remaining coverage comprising: (i) the fulfillment cash flows related to future service allocated to the group at that date, measured applying paragraphs 33–37 and B36–B92; (ii) the contractual service margin of the group at that date, measured applying paragraphs 43–46; and (b) the liability for incurred claims, comprising the fulfillment cash flows related to past service allocated to the group at that date, measured applying paragraphs 33–37 and B36–B92.

Source: https://www.ifrs.org/issued-standards/list-of-standards/ifrs-17-insurance-contracts/.

Panel B: Illustrative example of current-value measurement of insurance-contract groups (IFRS 17)

	Example 1A CU		Example 1B CU
Estimates of the present value of future cash inflows	(900)		(900)
Estimates of the present value of future cash outflows	545		1,089
Estimates of the present value of future cash flows	(355)		189
Risk adjustment for nonfinancial risk	120		120
Fulfillment cash flows[(a)]	(235)		309
Contractual service margin	235	[(b)]	-
Insurance contract(asset)/ liability on initial recognition[(d)]	-		309
The effect on profit or loss on initial recognition is as follows:			
Insurance service expenses	-		(309)

Source: https://www.hkicpa.org.hk/-/media/HKICPA-Website/Members-Handbook/volumeII/hkfrs17.pdf

Panel C: Illustrative example of aggregation level of insurance-contract groups (IFRS 17)

IFRS 4 (superseded accounting standards for insurance contracts)
The insurers report the net income of all the contracts for each product.

Loss-making, 2021, Singapore	Loss-making, 2020, Singapore	Loss-making, 2019, Singapore	Loss-making, 2021, Hong Kong	Loss-making, 2020, Hong Kong	Loss-making, 2019, Hong Kong
Profit-making, 2021, Singapore	Profit-making, 2020, Singapore	Profit-making, 2019, Singapore	Profit-making, 2021, Hong Kong	Profit-making, 2020, Hong Kong	Profit-making, 2019, Hong Kong
Potentially loss-making, 2021, Singapore	Potentially loss-making, 2020, Singapore	Potentially loss-making, 2019, Singapore	Potentially loss-making, 2021, Hong Kong	Potentially loss-making, 2020, Hong Kong	Potentially loss-making, 2019, Hong Kong

IFRS 17 (new accounting standards for insurance contracts)
The insurers divide contracts into Singapore portfolio and Hong Kong portfolio (homogeneous risk), divide each portfolio by year (annual cohort), and then divide each annual cohort into three groups, for which the insurers report the profit/loss for each contract group.



Loss-making, 2021, Hong Kong	Loss-making, 2020, Hong Kong	Loss-making, 2019, Hong Kong
Profit-making, 2021, Hong Kong	Profit-making, 2020, Hong Kong	Profit-making, 2019, Hong Kong
Potentially loss-making, 2021, Hong Kong	Potentially loss-making, 2020, Hong Kong	Potentially loss-making, 2019, Hong Kong

Panel D: Excerpts from Fairfax's 2016–2018 annual reports

Ultimate parent	Name	Fairfax Financial Holdings Limited
	Country	Canada
US domiciled insurer	Name	Allied World Assurance Holdings (US) Inc.; Aw Underwriters, Inc.; United States Fire Insurance Company; Odyssey Reinsurance Company; Crum & Forster Holdings Corp.; Zenith National Insurance Corp.; Zenith Insurance Company; Allied World Insurance Company
	Country	US.
Fairfax's annual report	Year	2016 (pre-IFRS 17 release year)
	Excerpt	The final standard is expected to be published in May of 2017, with an effective date of January 1, 2021. Retrospective application will be required with some practical expedients available on adoption. The company is currently evaluating the potential impact of IFRS 17 on its consolidated financial statements and does not expect to adopt the proposed standard in advance of its effective date.
Fairfax's annual report	Year	2017 (IFRS 17 release year)
	Excerpt	In May 2017 the IASB issued IFRS 17, a comprehensive standard that establishes principles for the recognition, measurement, presentation, and disclosure of insurance contracts . . . The standard is effective for annual periods beginning on or after January 1, 2021, with retrospective application and some practical expedients available on adoption. The company has commenced implementation planning, education workshops and impact assessments at its largest insurance and reinsurance companies in preparation for the adoption of IFRS 17. (p. 50)
Fairfax's annual report	Year	2018 (post-IFRS 17 release year)
	Excerpt	In May 2017 the IASB issued IFRS 17, a comprehensive standard that provides guidance on the recognition, measurement, presentation, and disclosure of insurance contracts. . . . The standard is effective for the company on January 1, 2021 and must be applied retrospectively with restatement of comparatives unless impracticable. In November 2018, the IASB tentatively deferred the effective date of IFRS 17 by one year. The company will continue to monitor the IASB's developments and is currently evaluating the impact of the standard on its consolidated financial statements.

Appendix B: Product rate filing example

This appendix presents excepts from Allstate's 2017 product rate filing.

Filing at a glance
Company: Allstate Insurance Company Product Name: AIC CON State: California TOI: 04.0 Homeowners Sub-TOI: 04.0001 Condominium Homeowners Filing Type: Rate/Rule Date Submitted: 12/22/2017 SERFF Tr Num: ALSE-131317021 SERFF Status: Closed-Approved State Tr Num: 18–123 State Status: Approved Co Tr Num: R32034 & A#1: RAF UPDATE (+6.9%)
Rate information
Filing Method: Prior Approval Rate Change Type: Increase Overall Percentage of Last Rate Revision: 15.000% Effective Date of Last Rate Revision: 04/05/2016 Filing Method of Last Filing: Prior Approval SERFF Tracking Number of Last Filing: ALSE-130093512
Company rate information
Company Name: ALLSTATE INSURANCE COMPANY Overall Indicated Change: 24.300% Overall Rate Impact: 6.900% Written Premium Change for this Program: $2,906,989 Number of Policy Holders Affected for this Program: 91,744 Written Premium for this Program: $41,991,179 Maximum % Change (where req'd): 9.600%; Minimum % Change (where req'd): 0.500%
Explanatory memorandum
Indication of rate need and proposed rate revisions This filing supports a rate request of an overall 6.9% increase for the California Condominium line of business in Allstate Insurance Company based on an overall 24.3% indicated rate level need, with the final effective date to be determined upon approval.

Appendix C: Variable definitions

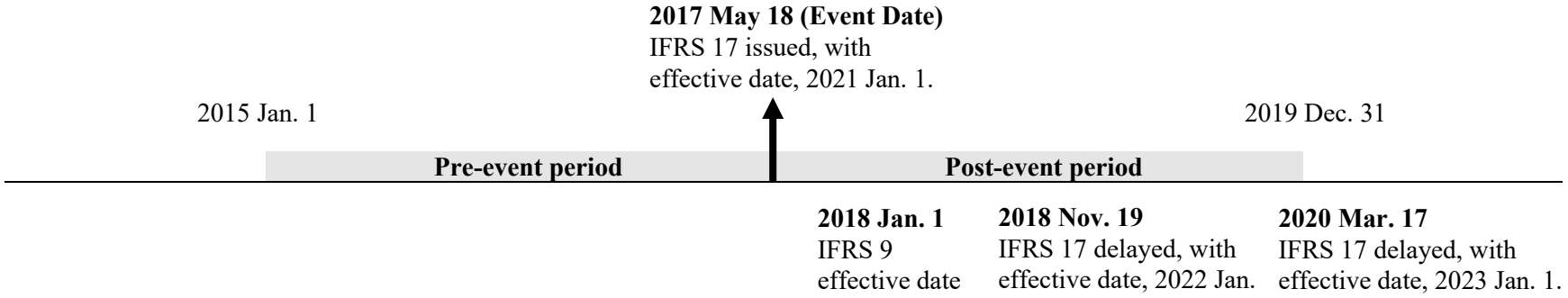
Variable	Description
Product pricing variables	
Δ*Markup*	The difference between the overall rate impact and the overall indicated change, measured as (100% + overall rate impact)− (100% + overall indicated change), with positive (negative) value indicating an upward adjustment (a downward adjustment) in markup. Overall rate impact (in %) is the statewide premium change to the accepted rates requested for the product and overall indicated change (in %) is the statewide premium change for the product determined by the company to achieve state stated actuarial objectives for the filing. Source: S&P Global Market Intelligence Insurance Product Filings.
Premium	The natural logarithm of one plus the amounts of product-specific statewide premiums. Source: S&P Global Market Intelligence Insurance Product Filings.
Policies	The natural logarithm of one plus the number of product-specific statewide policyholders affected. Source: S&P Global Market Intelligence Insurance Product Filings.
Decrease	An indicator variable equal to 1 if the di difference between the overall rate impact and the overall indicated change is negative, and 0 otherwise. Source: S&P Global Market Intelligence Insurance Product Filings.
Increase	An indicator variable equal to 1 if the difference between the overall rate impact and the overall indicated change is positive, and 0 otherwise. Source: S&P Global Market Intelligence Insurance Product Filings.
Variables of interest	
Treat	An indicator variable equal to 1 if the insurer is ultimately controlled by a parent firm from a country that requires mandatory IFRS adoption, and 0 otherwise. Source: S&P Global Market Intelligence Insurance Product Filings.
Post	An indicator variable equal to 1 if the filing is submitted in the period after the release of IFRS 17 (May 18, 2017), and 0 otherwise. Source: S&P Global Market Intelligence Insurance Product Filings.
Control variables	
Size	The natural logarithm of one plus the total assets. Source: S&P Global Market Intelligence Insurance Statutory Financials.
RBC Ratio	The ratio of total adjusted capital (TAC) divided by risk-based capital (RBC), where TAC includes the statutory capital and surplus and RBC is a statutory minimum level of capital determined by company size and the inherent riskiness of insurer's financial assets and operations. Source: S&P Global Market Intelligence Insurance Statutory Financials.
ROA	Net income divided by average total assets. Source: S&P Global Market Intelligence Insurance Statutory Financials.
Reinsurance	Reinsurance liabilities divided by total assets. Source: S&P Global Market Intelligence Insurance Statutory Financials.

Variable	Description
Financial performance variable	
ROE	Net income divided by average total equities. Source: S&P Global Market Intelligence Insurance Statutory Financials.
Nonpricing variables	
New Product	An indicator variable equal to 1 if the rate filing is to develop a new product (the rate filing indicates "New Program"), and 0 otherwise (i.e., the rate filing is to modify the product terms of an existing product). Source: S&P Global Market Intelligence Insurance Product Filings.
Long Tail	The new product belongs to long-tail product lines, including Homeowners/Farm-Owners Multiple-Peril (HM), Private Auto Liability (PA), Commercial Auto Liability (CA), Commercial Multiple-Peril (CM), Other Liability (OL), and Medical Malpractice (MM). Source: Nelson (2000) and S&P Global Market Intelligence Insurance Product Filings.
Short Tail	The new product does not belong to long-tail product lines. Source: Nelson (2000) and S&P Global Market Intelligence Insurance Product Filings.
Market reaction variables	
$CAR[-1,+1]_{Parent}$	Cumulative abnormal return during day −1 to day + 1, with day 0 being the announcement date of IFRS 17 (May 18, 2017). Abnormal return is calculated as actual return minus expected return based on market model estimated over the period [−150, −30] trading days. Source: Datastream and S&P Global Market Intelligence Insurance Statutory Financials.
$CAR[-5, -2]_{Parent}$	Cumulative abnormal return during day −5 to day −2, with day 0 being the announcement date of IFRS 17 (May 18, 2017). Abnormal return is calculated as actual return minus expected return based on market model estimated over the period [−150, −30] trading days. Source: Datastream and S&P Global Market Intelligence Insurance Statutory Financials.
$Treat_{Parent}$	An indicator variable equal to 1 if the firm is from a country that requires mandatory IFRS adoption, and 0 otherwise. Source: Worldscope.
$Size_{Parent}$	The natural logarithm of one plus the total assets. Source: Worldscope.
$TobinQ_{Parent}$	Total assets minus book value of equity plus market value of equity divided by book value of total assets. Source: Worldscope.
$Leverage_{Parent}$	Total liabilities divided by total assets. Source: Worldscope.
Partitioning variables	
HHI	The sum of the squared market share of each insurer in the same filing state, with a range from 0 to 10,000. Source: S&P Global Market Intelligence Insurance Statutory Financials.
Fina Literacy	An index capturing consumers' financial literacy, measured as the average value of all the responses to the survey in the state, where the response has a value of 1 if the answer is correct and 0 otherwise. Source: National Financial Capability Study (NFCS).
Volatility	Standard deviation of ROA over the five-quarter period from quarter *q–4* to quarter *q*. Source: S&P Global Market Intelligence Insurance Statutory Financials.

Figure 1
Timeline of the accounting standards for insurance contracts

Panel A presents the evolution of IFRS 17 *Insurance Contracts*, from the release to the delay announcements, and the effective date of IFRS 9 *Financial Instruments*, which mandates on insurers' financial reporting through their asset side. Panel B presents the framework of our difference-in-differences (DiD) analysis, with the US-domiciled P&C insurers from IFRS-adopting countries as the treatment insurers and the US-domiciled P&C insurers from non-IFRS-adopting countries as the benchmark insurers. We assign IFRS 17 release date as the event date (2017 May 18), with pre-event period (2015 Jan. 1–2017 May 17) and post-event period (2017 May 18–2019 Dec. 31). The shift from IFRS 4 to IFRS 17 among treatment insurers and the homogeneous local accounting standards among treatment and benchmark insurers collectively provide a clean setting to test insurers' responses to the release of IFRS 17.

Panel A: Timeline



Panel B: Accounting standards for treatment and benchmark insurers, pre-event vs. post-event period

	Accounting Standards for Insurance Contracts	
Treatment insurers	**Parent firms' consolidated statement: IFRS 4** US-domiciled sub. Unconsolidated statement: SAP/GAAP	**Parent firms' consolidated statement: IFRS 17** US-domiciled sub. Unconsolidated statement: SAP/GAAP
Benchmark insurers	Parent firms' consolidated statement: SAP/GAAP US-domiciled sub. Unconsolidated statement: SAP/GAAP	Parent firms' consolidated statement: SAP/GAAP US-domiciled sub. Unconsolidated statement: SAP/GAAP

Figure 2
Distribution of product rate filings by state
This figure plots the number of product rate filings in our matched sample (N of Obs.=6,832) by state.

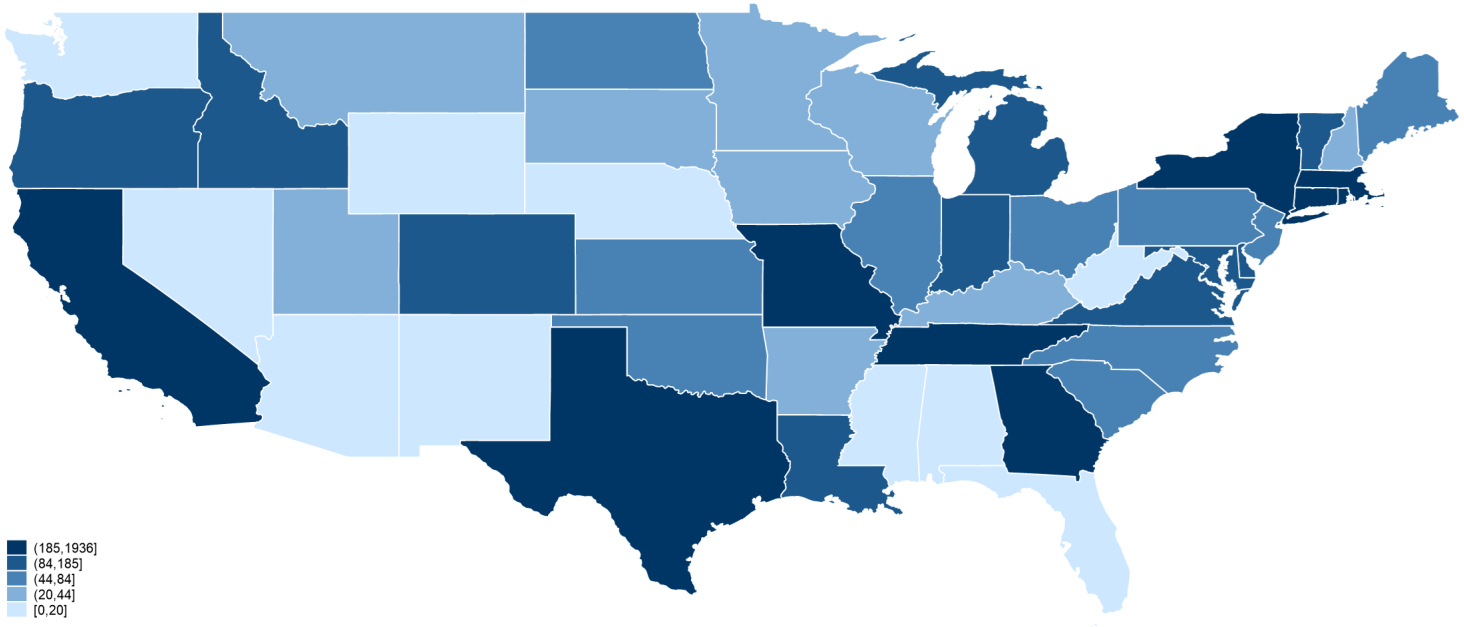


Table 1
Sample selection and distribution
Panel A reports the sample selection. Panels B and C report the sample distribution of product rate filings by year-quarter and home country. Panel D reports the comparison of means across the matched treatment and benchmark samples. We match each filing issued by the treatment insurers to a filing issued by the benchmark insurers in the same month, based on filing state, product type, lagged quintile *ROA*, lagged quintile *Size*, lagged quintile *RBC Ratio*, as well as closest *ROA*. See Appendix C for variable definitions. *, **, and *** indicate significance at the 10%, 5%, and 1% two-tailed levels, respectively.

Panel A: Sample selection

	Total	
	#Filings	**#Insurers**
Step 0: All US product filings on S&P Global Market Intelligence Insurance Product Filings database, submitted during the period from Jan. 1, 2015, to Dec. 31, 2019	2,569,339	2,195
Step 1: Remove product filings that do not involve rate change, i.e., filings with rule and/or form change	-1,726,492	-177
Step 2: Remove product rate filings with filings submission date earlier than last revision date and/or with missing values of product rate and/or with negative/missing values of gross written premium	-400,605	-251
Step 3: Remove product rate filings without financial information from S&P Global Market Intelligence Insurance Statutory Financials required for empirical analysis	-19,295	-135
Step 4: Remove insurers with mutual ownership structure	-71,072	-546
Step 5: Remove treatment insurers with private parent	-7,535	-39
Step 6: Remove insurer-years with risk-based capital ratios outside 200% and 2000%	-120,016	-329
Full Sample	224,324	718
Step 7: Construct matched sample	-217,492	-418
Final Sample	**6,832**	**300**

Panel B: Distribution of product rate filings by year-quarter (N. of Obs.= 6,832 Filings)

YQ	N	%	YQ	N	%	YQ	N	%
2015Q1	147	2.15	2016Q4	257	3.76	2018Q3	293	4.29
2015Q2	180	2.63	2017Q1	396	5.8	2018Q4	406	5.94
2015Q3	225	3.29	2017Q2	607	8.88	2019Q1	365	5.34
2015Q4	243	3.56	2017Q3	424	6.21	2019Q2	590	8.64
2016Q1	323	4.73	2017Q4	399	5.84	2019Q3	272	3.98
2016Q2	396	5.8	2018Q1	360	5.27	2019Q4	313	4.58
2016Q3	336	4.92	2018Q2	300	4.39	**Total**	**6,832**	**100**

Table 1, continued

Panel C: Distribution of product rate filings by home country (N. of obs. = 6,832 filings)

	Accounting Standards			
Home Country	**US-domiciled subsidiary unconsolidated statement**	**Parent consolidated statement**	**N**	**%**
Australia	SAP/US GAAP	IFRS	332	4.86
Bermuda	SAP/US GAAP	IFRS	283	4.14
Canada	SAP/US GAAP	IFRS	705	10.32
Cayman Islands	SAP/US GAAP	IFRS	42	0.61
France	SAP/US GAAP	IFRS	192	2.81
Germany	SAP/US GAAP	IFRS	252	3.69
Japan	SAP/US GAAP	IFRS	752	11.01
Mexico	SAP/US GAAP	IFRS	4	0.06
South Korea	SAP/US GAAP	IFRS	7	0.1
Switzerland	SAP/US GAAP	IFRS	877	12.84
United Kingdom	SAP/US GAAP	IFRS	15	0.22
United States	SAP/US GAAP	US GAAP	3,371	49.34
Total		**Total**	**6,832**	**100**

Panel D: Effectiveness of matches (N. of obs.= 6,832 filings)

Variable		**Mean value, treatment insurers**	**Mean value, benchmark insurers**	**Diff., Treatment-benchmark**
Size	Pre-match	20.835	20.945	-0.109
	Post-match	*20.947*	*21.009*	*-0.062*
RBC RATIO	Pre-match	585.941	762.375	-176.434***
	Post-match	*581.400*	*591.861*	*-10.461*
ROA	Pre-match	0.005	0.007	-0.002**
	Post-match	*0.005*	*0.005*	*-0.001*
Reinsurance	Pre-match	0.161	0.066	0.095***
	Post-match	*0.123*	*0.093*	*0.030*

Table 2
Descriptive statistics
Panel A reports the summary statistics of the variables used in our main regressions. Panel B reports the Pearson correlation coefficients. See Appendix C for variable definitions. A correlation coefficient in bold indicates that the correlation is statistically significant at better than the 5% two-tailed level.

Panel A: Descriptive statistics (N. of obs. = 6,832 filings)

Variable	Mean	Median	STD
Δ*Markup*	-2.002	0.000	8.254
Post	0.593	1.000	0.491
Treat	0.507	1.000	0.500
Size	20.978	20.998	1.707
Total Assets (in million USD)	4321.197	1316.769	7131.781
RBC Ratio	586.561	484.895	317.017
ROA	0.005	0.005	0.009
Reinsurance	0.108	0.057	0.146

Panel B: Correlation matrix (N. of obs. = 6,832 filings)

	(1)	(2)	(3)	(4)	(5)	(6)
Δ*Markup*						
Post	0.005					
Treat	**-0.047**	0.003				
Size	**-0.059**	**0.100**	-0.018			
RBC Ratio	**-0.053**	**-0.047**	-0.017	**-0.552**		
ROA	**-0.046**	-0.020	**-0.042**	**0.127**	**0.121**	
Reinsurance	**0.034**	**-0.042**	**0.103**	**-0.132**	-0.000	**-0.048**

Table 3
The release of IFRS 17 and insurance product pricing
This table reports the analysis of IFRS 17 release and insurance product pricing at the filing level. Panel A reports the baseline results. Panel B reports the results for robustness checks, including assessing the parallel-trends assumption, using placebo tests with 2016 May 18 and 2018 January 1 as the pseudo-event dates (one year prior to the actual IFRS 17 release date and the effective date of IFRS 9), and using the full sample. See Appendix C for variable definitions. Standard errors are clustered at the insurer level. *T* statistics that are statistically significant at the 1%, 5% and 10% levels are indicated by ***, ** and *, respectively.

Panel A: The release of IFRS 17 and insurance product pricing (N. of obs. = 6,832 filings)

Dep. var.=	Δ***Markup***			
	(1)	(2)	(3)	(4)
Post × Treat	-1.613**	-1.450**	-1.845**	-1.796**
	(-2.28)	(-2.00)	(-2.32)	(-2.16)
Size				-0.700
				(-0.56)
RBC Ratio				-0.001
				(-0.48)
ROA				43.606**
				(2.26)
Reinsurance				1.626
				(0.86)
State-YM FE	No	Yes	Yes	Yes
Insurer-Product FE	Yes	No	Yes	Yes
Observations	6,832	6,832	6,832	6,832
Adj. R-squared	0.368	0.128	0.476	0.476

Panel B: Robustness checks

Dep. var.=	Δ***Markup***			
	Timing approach	**Placebo test, Pre-release**	**Placebo test, IFRS 9**	**Full sample**
	(1)	(2)	(3)	(4)
Post × Treat		-0.398	0.338	-0.571*
		(-0.33)	(0.24)	(-1.66)
Pre1 × Treat	-1.462			
	(-1.06)			
Post0 × Treat	-1.431			
	(-1.11)			
Post1 × Treat	-2.185*			
	(-1.74)			
Post2+ × Treat	-2.097**			
	(-2.06)			
Controls	Yes	Yes	Yes	Yes
State-YM FE	Yes	Yes	Yes	Yes
Insurer-Product FE	Yes	Yes	Yes	Yes
Observations	6,832	2,739	3,913	224,324
Adj. R-squared	0.476	0.575	0.494	0.278

Table 4
Channel analyses
This table reports the analysis of IFRS 17 release and insurance product pricing at the filing level, conditional on filing states' market concentration, financial literacy, earnings volatility, and capital adequacy. Panel A reports the descriptive statistics of the partitioning variables, measured as of the quarter prior to the IFRS 17 release (2017Q1). Panels B, C, D, and E report the regression results. See Appendix C for variable definitions. Robust standard errors are clustered at the insurer level. *t* statistics that are statistically significant at the 1%, 5% and 10% levels are indicated by ***, ** and *, respectively.

Panel A: Descriptive statistics (N. of obs. = 6,832 filings)

Variable	Mean	Median	STD
HHI	1166.978	1082.689	618.431
Fina Literacy	1.785	1.788	0.138
Volatility	0.007	0.005	0.008
RBC Ratio	627.555	455.560	1235.198

Panel B: Regression analysis conditional on product market concentration

Dep. var.=	**Δ*Markup***			
***HHI*=**	**High**	**Low**	**High**	**Low**
	(1)	(2)	(3)	(4)
Post × *Treat*	0.038	-2.856***	0.481	-2.955***
	(0.04)	(-2.95)	(0.41)	(-3.07)
Controls	No	No	Yes	Yes
State-YM FE	Yes	Yes	Yes	Yes
Insurer-Product FE	Yes	Yes	Yes	Yes
Observations	3,547	3,285	3,547	3,285
Adj. R-squared	0.512	0.680	0.514	0.682

Panel C: Regression analysis conditional on financial literacy

Dep. var.=	**Δ*Markup***			
***Fina Literacy* =**	**High**	**Low**	**High**	**Low**
	(1)	(2)	(3)	(4)
Post × *Treat*	-2.639**	-1.048	-2.445**	-1.127
	(-2.36)	(-1.09)	(-2.14)	(-1.13)
Controls	No	No	Yes	Yes
State-YM FE	Yes	Yes	Yes	Yes
Insurer-Product FE	Yes	Yes	Yes	Yes
Observations	3,351	3,481	3,351	3,481
Adj. R-squared	0.552	0.525	0.553	0.527

Table 4, continued

Panel D: Regression analysis conditional on earnings volatility

Dep. var.=	**Δ*Markup***			
***Volatility* =**	**High**	**Low**	**High**	**Low**
	(1)	(2)	(3)	(4)
Post × Treat	0.274	-2.678*	0.920	-2.479
	(0.33)	(-1.68)	(0.87)	(-1.56)
Controls	No	No	Yes	Yes
State-YM FE	Yes	Yes	Yes	Yes
Insurer-Product FE	Yes	Yes	Yes	Yes
Observations	3,494	3,338	3,494	3,338
Adj. R-squared	0.520	0.552	0.521	0.555

Panel E: Regression analysis conditional on capital adequacy

Dep. var.=	**Δ*Markup***			
***RBC Ratio* =**	**High**	**Low**	**High**	**Low**
	(1)	(2)	(3)	(4)
Post × Treat	-3.293**	-1.533	-3.592**	-1.061
	(-2.08)	(-1.56)	(-2.12)	(-1.00)
Controls	No	No	Yes	Yes
State-YM FE	Yes	Yes	Yes	Yes
Insurer-Product FE	Yes	Yes	Yes	Yes
Observations	3,397	3,435	3,397	3,435
Adj. R-squared	0.521	0.546	0.523	0.547

TABLE 5
The release of IFRS 17 and nonpricing strategy
This table reports the analysis of IFRS 17 release and insurers' nonpricing strategy at the filing level. The estimation of this analysis uses the full sample instead of the matching sample because there is no new product release in the matched sample. Panel A reports the descriptive statistics of the nonpricing variables. Panel B reports the regression results. See Appendix C for variable definitions. Robust standard errors are clustered at the insurer level. *t* statistics that are statistically significant at the 1%, 5% and 10% levels are indicated by ***, ** and *, respectively.

Panel A: Descriptive statistics (N. of Obs.=224,324 Filings)

		Mean	Median	STD
All product lines	*New Product*	0.046%	0.000%	2.142%
Long-tail product lines	*New Product*	0.023%	0.000%	1.522%
Short-tail product lines	*New Product*	0.023%	0.000%	1.508%

Panel B: Regression analysis

Dep. Var.=	***New Product***			
	All lines	**All lines**	**Long tail**	**Short tail**
	(1)	(2)	(3)	(4)
Post × Treat	0.002*	0.002*	0.001	0.001**
	(1.75)	(1.80)	(1.43)	(2.04)
Size		-0.001*	-0.000*	-0.001
		(-1.65)	(-1.89)	(-1.53)
RBC Ratio		-0.003*	-0.001*	-0.001*
		(-1.96)	(-1.72)	(-1.86)
ROA		-0.000	-0.000	-0.000
		(-1.59)	(-1.15)	(-1.16)
Reinsurance		0.003	0.003	-0.001
		(0.31)	(0.53)	(-0.21)
State-YM FE	Yes	Yes	Yes	Yes
Insurer-Product FE	Yes	Yes	Yes	Yes
Observations	224,324	224,324	224,324	224,324
Adj. R-squared	0.202	0.203	0.166	0.168

Table 6
Analyses of revenue and profitability
This table reports the analysis of IFRS 17 release, product revenue, and insurer profitability. Panels A and B report the descriptive statistics of the product-revenue variables at the filing level and insurer-profitability variables at the insurer-quarter level, respectively. Panels C and D report the regression results using product-revenue and insurer-profitability variables as dependent variables, respectively. See Appendix C for variable definitions. Robust standard errors are clustered at the insurer level. *T* statistics that are statistically significant at the 1%, 5% and 10% levels are indicated by ***, ** and *, respectively.

Panel A: Descriptive statistics of revenue variables (N. of obs. = 6,832 filings)

Variable	N	Mean	Median	STD
Premium	6,832	7.054	8.987	6.863
Policies	6,805	2.255	0.693	2.740

Panel B: descriptive statistics of profitability variables (N. of obs. = 5,961 insurer-quarters)

Variable	N	Mean	Median	STD
ROA	5,961	0.005	0.006	0.011
ROE	5,961	0.015	0.014	0.032

Panel C: Regression analysis of revenue

Dep. var.=	***Premium***		***#(Policies)***	
	(1)	(2)	(3)	(4)
Post × Treat	2.286***	2.118***	0.800***	0.749***
	(4.94)	(4.28)	(3.90)	(3.46)
Controls	No	Yes	No	Yes
State-YM FE	Yes	Yes	Yes	Yes
Insurer-Product FE	Yes	Yes	Yes	Yes
Observations	6,832	6,832	6,805	6,805
Adj. R-squared	0.667	0.669	0.681	0.683

Panel D: Regression analysis of profitability

Dep. var.=	***ROA***		***ROE***	
	(1)	(2)	(3)	(4)
Post × Treat	-0.001*	-0.001*	-0.006**	-0.006**
	(-1.78)	(-1.66)	(-2.59)	(-2.33)
Controls	No	Yes	No	Yes
Insurer FE	Yes	Yes	Yes	Yes
YQ FE	Yes	Yes	Yes	Yes
Observations	5,961	5,961	5,961	5,961
Adj. R-squared	0.269	0.270	0.242	0.243

Table 7
Market reactions
This table reports the market reactions to the release of IFRS 17 at the parent firm level. Panel A reports the descriptive statistics on cumulative abnormal return (*CAR*). Panel B reports the results of market reactions to IFRS 17 announcements. See Appendix C for variable definitions. Robust standard errors are clustered at the country level. *t* statistics that are statistically significant at the 1%, 5% and 10% levels are indicated by ***, ** and *, respectively.

Panel A: Descriptive statistics (N. of obs. = 45 parent-events)

Event window		$CAR[-1,+1]_{Parent}$		$CAR[-5,-2]_{Parent}$	
		Treatment parent firms	**Benchmark parent firms**	**Treatment parent firms**	**Benchmark parent firms**
2017 May 18, the IASB released *IFRS 17 – Insurance Contracts*	**N**	13	32	13	32
	Mean	-0.332	0.901	-2.252	-1.156
	Median	-0.500	1.011	-1.780	-1.236
	STD	1.669	1.828	2.310	2.107

Panel B: Regression analysis

Dep. Var.=	$CAR[-1,+1]_{Parent}$		$CAR[-5,-2]_{Parent}$	
	(1)	(2)	(3)	(4)
$Treat_{Parent}$	-1.233***	-1.382***	-1.096	-0.855
	(0.268)	(0.350)	(0.626)	(0.584)
$Size_{Parent}$		-0.002		0.065
		(0.077)		(0.075)
$TobinQ_{Parent}$		-0.032		-0.286**
		(0.031)		(0.083)
$Leverage_{Parent}$		1.183		-4.281***
		(1.108)		(1.075)
Observations	45	45	45	45
Adj. R-squared	0.072	0.014	0.030	0.038

Table 8
Robustness checks
This table reports the robustness tests at the filing level. Panel A reports the tests excluding influential observations by filing state, home country, and product line. Panel B reports the tests using (1) alternative samples: excluding the release quarter of IFRS 17 and the one-to-N matched sample; and (2) alternative measures: *Decrease* (*Increase*) is an indicator variable equal to 1 if the change in Δ*Markup* is negative (positive), and 0 otherwise. Panel C reports the tests using approval-based filing methods (the state rating law on filing method is "Prior Approval" or "Review and Approval"), competitive filing methods (the state rating law on filing method is "File and Use" or "Use and File"), ongoing filing status (the current status of the product filing is "approved" or "pending") and terminated filing status (the current status of the product filing is "disapproved" or "withdrawn"). See Appendix C for variable definitions. Robust standard errors are clustered at the insurer level. *T* statistics that are statistically significant at the 1%, 5% and 10% levels are indicated by ***, ** and *, respectively.

Panel A: Influential observations

Dep. var. =	Δ***Markup***		
	Excl. Texas	**Excl. Switzerland**	**Excl. other liability product line**
	(1)	(2)	(3)
Post × *Treat*	-1.896*	-1.755**	-2.004**
	(-1.94)	(-2.09)	(-2.08)
Controls and FEs	State-YM FE and Insurer-Product FE		
Observations (Filings)	4,896	5,955	5,143
Adj. R-squared	0.523	0.491	0.512

Panel B: Alternative samples and measures

Dep. var. =	Δ***Markup***	Δ***Markup***	***Decrease***	***Increase***
	Excl. release quarter	**One-to-N quintile matching**	**Alternative dependent variable**	**Alternative dependent variable**
	(1)	(2)	(3)	(4)
Post × *Treat*	-1.779*	-1.859**	0.155***	-0.004
	(-1.86)	(-2.18)	(3.75)	(-0.12)
Controls and FEs	State-YM FE and Insurer-Product FE			
Observations (Filings)	6,225	7,353	6,832	6,832
Adj. R-squared	0.472	0.462	0.538	0.379

Panel C: Filing method and filing status

Dep. var. =	Δ***Markup***			
	Filing Method		**Filing Status**	
	Approval based	**Competitive**	**Ongoing**	**Terminated**
	(1)	(2)	(3)	(4)
Post × *Treat*	-1.853	-1.583*	-1.817**	-0.733
	(-1.23)	(-1.65)	(-2.20)	(-0.56)
Controls and FEs	State-YM FE and Insurer-Product FE			
Observations (Filings)	1,654	5,178	3,930	2,902
Adj. R-squared	0.772	0.533	0.366	0.575