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Does Regulatory Scrutiny Change Investment Behavior? Evidence of Suboptimal Portfolio Rebalancing After the Financial Crisis

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ABSTRACT

Insurers that show losses are expected to sell tax-free securities and replace them with taxable securities since they can no longer benefit from tax savings. However, rebalancing these portfolios after the financial crisis would entail recognizing additional losses during a time period when their financial performance was under stress and their industry was under increased scrutiny. I examine portfolio rebalancing behavior using the period after the financial crisis as a proxy for increased regulatory scrutiny. I predict and find that insurers with losses subsequent to the financial crisis were less likely to increase their ratio of taxable/nontaxable securities. Insurers may also face increased regulatory scrutiny due to their own actions which I measure as whether an insurer is in regulatory violation. I further find that insurers that are in regulatory violation (using IRIS ratios) during the financial crisis are less likely to increase their ratio of taxable/nontaxable securities.

Key words: Statutory Accounting Principles, Insurance, Tax-free and Taxable Securities, Regulation

DOES REGULATORY SCRUTINY CHANGE INVESTMENT BEHAVIOR? EVIDENCE OF SUBOPTIMAL PORTFOLIO REBALANCING AFTER THE FINANCIAL CRISIS

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DISSERTATION

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PREFACE

The aim of this paper is to examine the impact of regulation, in particular, increased regulatory scrutiny, on investment choice. Specifically, I examine whether property and casualty (P&C) insurers are less likely to rebalance their portfolios of investment securities subsequent to the financial crisis.

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Data Source: National Association of Insurance Commission (NAIC), by permission. The NAIC does not endorse any analysis or conclusions based upon the use of its data.

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1. Introduction

"Insurance regulation has traditionally focused strongly on product regulation, supervising the terms and prices of individual policies. More recently, the focus has shifted towards a comprehensive regulation of solvency. As a consequence of the recent financial crisis, solvency regulation of financial institutions for insurers is set to tighten further (Baltensperger, 2011)."

The aim of this paper is to examine the impact of regulation, in particular, increased regulatory scrutiny, on investment choice. Specifically, I examine whether property and casualty (P&C) insurers are less likely to rebalance their portfolios of investment securities subsequent to the financial crisis. Consistent with efficient tax strategy, I find that insurers rebalance their tax-free securities towards taxable securities in the year subsequent to reporting a loss. This incentive declines when insurers are under regulatory scrutiny, either brought upon themselves when they are in regulatory violation (measured by their Insurance Regulatory Information Systems (IRIS) ratios[1]), or increased scrutiny outside of their control as was the case after the financial crisis. I estimate that an insurer with a loss in the prior year will rebalance their tax-free securities towards taxable securities in the current year by 9.9 percent; however, this rebalancing strategy declines to 1.3 percent when the insurer is in regulatory violation after the financial crisis. For example, assuming an insurer had a loss of $1 from the prior year; I estimate that an insurer will rebalance $0.086 cents away from taxable securities when they are under heavy regulatory scrutiny and after the financial crisis.

The financial strategy of P&C insurers under normal circumstances is to invest in long-term assets, which include fixed income securities (both taxable and nontaxable), and real- estate holdings (Lambert and Hofflander, 1967). The recent financial crisis has caused losses for many

[1]Please see Appendix A for explanation and definition of IRIS ratios.

P&C insurers (Towers Perrin, 2008). Due to the ability to carry losses forward, finance theory would suggest that P&C insurers should shift from tax-free securities to taxable securities when facing losses because of the lower yield on tax-free securities.[2] For example, Smith (1989) suggests that insurers with underwriting losses could realign their portfolios by liquidating their tax-exempt securities and purchasing taxable securities. This allows insurers to earn higher yields on their investment portfolio as losses are deductible from taxable investment income, thereby making the after tax return on taxable investments greater than the return earned on tax-free investments. Though this strategy yields higher portfolio returns, P&C insurers may be less willing to rebalance from tax-free securities to taxable securities because they do not want to recognize potentially large investment losses on their financial statements subsequent to the financial crisis[3] since this is a period of increased regulatory scrutiny.

Historically, insurers have been the largest market for tax-free securities. Insurers' demand for tax-free securities is directly influenced by their insurance profits and losses. As losses increase, insurers' demand for taxable instruments increases since losses can be deducted from future investment income. This creates an increase in the after-tax yield on taxable investments. On the other hand, as losses decrease, insurers' demand for taxable instruments decreases and their demand for tax-exempt securities increases since the after tax yield of taxable securities with similar risk characteristics become equivalent to yields from tax-exempt securities (Kopcke and Randall, 1991). Like other financial intermediaries, insurers have experienced decreasing profitability because of the financial crisis. However, insurers have been reluctant to recognize investing losses in addition to operating losses.

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[2]This incentive is not specific to only the P&C industry. All firms should rebalance to take advantage of future tax savings. What makes this setting unique is the ability to observe the types of holdings within the portfolio and the regulatory environment.

[3]Warren Buffet stated that "*…insurers will not sell securities at price levels that would recognize the major losses, for any number of reasons, including public reaction, institutional pride or protection of stated net worth (Gurufocus.com).*"

Insurance companies are regulated by the National Association of Insurance Commissioners (NAIC) and state insurance regulators. As a result, the financial reporting of insurance companies is different than other types of firms. For example, insurance companies use Statutory Accounting Principles (SAP), instead of Generally Accepted Accounting Principles (GAAP). SAP has different objectives than GAAP as SAP is designed to satisfy the different needs of the insurance industry. The primary users of the statutory financial statements are state or local regulators. In addition, SAP is focused on the long-term liabilities of insurance companies and stresses the long-term claim-paying ability of the insurer. SAP results in lower capital and income volatility than GAAP. This type of financial reporting gives a more conservative measure of an insurer's financial stability.

The primary objective of insurance regulators and the NAIC is to minimize market failures that would otherwise cause insurers to incur an excessive risk of insolvency or engage in market abuses that hurt consumers. State insurance regulatory resources are employed to monitor market activities, compliance, and solvency (NAIC, 1995). Given the more conservative reporting under SAP and its use by regulators, insurers face unique pressure to maintain solvency compared to other financial intermediaries. This focus on solvency combined with increased scrutiny from insurance regulators after the financial crisis may lead insurers to make inefficient investment decisions. A 2009 article indicates that *"….given the financial crisis and recession, regulators have to show activity and demonstrate they're on top of things (Gusman, 2009)."*

This study examines one aspect of the investing decisions of P&C insurers, portfolio rebalancing. Specifically, I examine rebalancing from tax-free securities towards taxable securities after a loss occurs. This is the first study to examine investment decisions in a regulated industry after the financial crisis. This study highlights the importance of *asset*

maintenance for property and casualty insurance companies. For example, an insurer should rebalance their investment portfolio (i.e., shift tax-free securities to taxable securities) if losses persist into the future. Moreover, the financial crisis provides an exogenous setting to test rebalancing under increased regulatory scrutiny.

I examine the following research questions. First, do insurers rebalance their portfolios away from tax-exempt securities when reporting losses as is suggested in finance theory [see Liebowtiz (1981); Poterba (1986)], even during a financial crisis? My findings support prior theory and conclude that insurers make tax efficient investing decisions by rebalancing their portfolio towards taxable securities when losses occur. My second research question is whether regulatory scrutiny exogenous to insurers' behavior changes the relationship between tax incentives (losses) and investment decisions (portfolio rebalancing). I find that insurers continue rebalancing subsequent to the financial crisis, but that the amount of rebalancing is mitigated. This shows that increased regulatory scrutiny diminishes the relationship between tax incentives (losses) and efficient tax investing (portfolio rebalancing.) Lastly, I examine whether insurers with losses are even less likely to rebalance when they are in regulatory violation, which may signal to regulators that insurers have financial solvency problems.

The remainder of this paper is organized as follows. The next section reviews prior literature in the property and casualty industry that helps to illustrate the importance for insurers to rebalance toward taxable investments when losses occur. In section three, hypotheses are introduced and developed, while section four discusses the research design. Section five describes the sample selection process, defines the variables, and provides descriptive statistics and correlations. Section six reports the results and section seven reports sensitivity analyses. Section eight concludes and discusses the limitations.

2. Literature Review

This study discusses two streams of research: 1) research on rebalancing insurance companies' portfolios toward taxable investments; and 2) research on insurers and their regulatory environments.

2.1 Rebalancing toward taxable investments

Property and casualty insurers derive their income from two sources: underwriting and investing. Income from underwriting can be volatile and is historically generates negative income (Fairley, 1979). However, the major component of insurers' income is from investments, whether unrealized or realized losses/gains. Subsequent to the financial crisis, in my sample the average underwriting losses were $3,082,730. Thus, investment decisions in taxable and tax-free securities in this industry are paramount since insurers use their investment income to cover underwriting losses. P&C insurers generally invest in a mix of taxable and tax-free securities [see Lambert and Hofflander (1966); Lambert and Hofflander (1967)]. For example, Lambert and Hofflander (1966) describe the conflict between policyholders and shareholders of P&C insurers as a conflict between two goals: liquidity (for unexpected losses) and higher investment income (which may decrease liquidity.)

As a result, as insurers' income declines (or becomes a loss) insurers are inclined to sell their tax-free investments since they may not benefit from the tax savings and since the investments have a lower yield. With the ability to carry losses forward, insurers would gain a larger benefit from the higher yields from taxable investments in future periods. However, the rebalancing of a P&C insurer's portfolio of investments can send a negative signal to the capital markets since the insurer's investment strategies are called into question by investors (Oakland, 1973.) Prior literature describes why P&C insurers rebalance their tax-free securities to taxable

securities and vice versa [see Liebowitz (1981); Poterba (1986); Smith (1989); PonAnul and Viswanath (1995); Bradford and Logue (1998); Harrington and Niehaus (2003)].

An earlier study by Liebowitz (1981) showed that tax-free yield curves have a steeper slope than taxable yield curves, which indicate that P&C insurers invest in tax-free securities when taxable securities are too costly. Poterba (1986) discusses alternative theories that explain the tax-free/taxable yield spread and concludes that the market for tax-free securities is segmented, and provides evidence that the spreads between long-term taxable and tax-free securities respond to changes in expected future tax rates. Smith (1989) offers empirical evidence suggesting that tax-free/taxable yield ratios affect P&C insurers' returns, even when taxable interest rates are taken into account. PonAnul and Viswanath (1995) and Harrington and Niehaus (2003) show that when firms' tax-free securities increase, the yield differential between taxable and tax-free securities decreases, which results in an increase in net income after taxes. Bradford and Logue (1998) provide empirical evidence that P&C insurers are able to take advantage of underwriting losses by increasing holdings of taxable securities. Their study suggests that P&C insurers can rebalance their tax-free and taxable holding positions to obtain a higher yield.

Further, the earnings manipulation literature suggests P&C insurers' managers can manage tax savings and/or meet regulatory capital (solvency) requirements through loss reserve and asset-liability management [see Gaver and Paterson (1999); Ke, Petroni, and Shackelford (2000); Petroni, Ryan, and Whalen (2000); Nissim (2010)]. However, other studies have challenged why P&C insurers rebalance toward taxable investments. Derrig and Ostaszewski (1997) argue that the effective tax rate plays a role in determining combined investment and underwriting losses. By investigating insurers' use of the effective tax rate on investment income, several studies call into question prior literature that does not factor additional

parameters into theoretical models of underwriting losses [see Doherty and Garven (1986); Cummins (1990); Taylor (1994)], a method which other prior studies have used. Since tax-free securities usually have a lower pre-tax return than taxable securities, the effect of the mix of taxable investments and tax-free investments on a P&C insurer's overall tax liability becomes an important consideration in making investment decisions.[4]

2.2 Insurance and Regulatory Environment

Regulation is a primary component of insurers underwriting and investment activities. Prior studies focus on solvency regulation and regulation efficiency (NAIC, 1995). There are different monitoring mechanisms to detect insolvency among insurers. First, Insurance Regulatory Information Systems (IRIS) ratios assist regulators to fully assess the financial condition of an insurer.[5] IRIS ratios serve as an initial financial snapshot for state regulators to help detect which insurers need further in-depth analysis.[6] IRIS ratios are used to help regulators target resources on more risky insurers. I calculate the twelve IRIS ratios each year between 2007 through 2011 and compare these ratios to the acceptable ranges set by the National Association of Insurance Commission for each ratio. If insurers' fall outside of the usual ranges (i.e., four or more ratio violations), then the insurers require regulatory attention.[7,8] The IRIS ratios are valuable in identifying companies that are likely to experience financial

[4]Interest income on tax-free securities may not always be completely tax-free for P&C insurers. However, the line item for tax-free securities is listed as entirely tax-free.

[5] NAIC (2001) states,*" One of the most difficult tasks facing insurance regulators is to make effective use of limited resources. All companies are required to file annual statements with all states in which they are licensed to operate. Obviously, no state is able to review thoroughly the financial condition of all licensed companies immediately upon receipt of the annual statements. IRIS helps to select those companies that merit highest priority in the allocation of the regulators' resources, thus directing those resources to the best possible use."*

[6]Nissim (2010, 32) states…*"The IRIS ratios are only a preliminary screen for targeting troubled insurers, and regulators exercise judgment concerning the appropriate response to IRIS failure."*

[7]There are three possible levels of attention regulators have for review if insurers are outside of the usual range: Level A: high priority for review (e.g., Total score of 4 or more indicates Level A); Level B: may require review, but not immediate (e.g., Total score of 2 or 3 indicates Level B); and Reviewed, no level (e.g., Total score of 1 or 0 indicates Reviewed).

[8]The criteria for determining usual range values and the usefulness of the IRIS ratios, although based on the recent experience of companies becoming financially insolvent, may not be valid for future experience in different economic periods. For this reason, the components of the ratios are reviewed annually and updated as necessary.

difficulties. However, it is worth cautioning the reader that there are other ratios and trends used by regulators to measure adverse financial conditions by an insurer.

For example, Financial Analysis and Solvency Tracking (FAST) scores and Risk Based Capital (RBC) ratios have been implemented since the early 1990s to help identify insurers heading toward financial uncertainties and to help identify insurers that may be undercapitalized. The FAST scores direct attention to large, nationally recognized insurers, while IRIS ratios evaluate both large and small insurers. The RBC ratio is the theoretical amount of capital surplus needed to absorb the risks involved in the operation of business for insurers. The major areas of risk facing a P&C insurer include asset risk, underwriting and reserving risk, and credit risk. However, IRIS ratios are still the most commonly used method in prior literature [see Petroni (1992); Beaver, McNichols, and Nelson (2003); Gaver and Patterson (2004); Gaver and Patterson (2007)]; therefore IRIS ratios are used in this study.

However, other studies have adopted both the FAST scores and RBC ratios. For example, using the FAST scores and the RBC ratios, Cummins, Grace, and Phillips (1999) test a large sample of P&C insurers to predict insolvencies over a three-year time horizon. The authors find that FAST scores are better than RBC ratios in predicting insurers' insolvency. Grace, Harrington, and Klein (1998) examine the probability of correctly identifying weak insurers using FAST scores and RBC ratios. Their findings show that the FAST system dominates RBC ratios in identifying financially weak P&C insurers. Finally, from an international perspective, Cummins and Phillips (2009) compare the United States (US) RBC system with the European Union Solvency II system, and the Swiss Solvency Test. The limitations the authors find for the US are related to operational and catastrophe risks and qualitative measures such as corporate governance.

P&C insurers that serve policyholders in the US are regulated at the state level. Each state has enacted statutes and an extensive list of regulatory requirements that are designed to protect policyholders (Nissim, 2010).[9] Grace (1990) hypothesizes that overestimating reserves offers an opportunity for insurers to shelter profits. Nelson (2000) hypothesizes that insurers conducting business in a stringent rate regulatory environment will under-reserve in order to persuade regulators they can charge a lower price than the regulated rate. Kwon, Kim, and Lee (2005) find that regulators tend to stress their responsibilities to protect policyholders' interests and be thoroughly involved with the exit strategy of the distressed insurer. In a recent article, Harrington (2009) studied the role of American International Group (AIG), the insurance sector in the 2007–2009 financial crisis, and the implications for insurance regulation. He discusses which insurers carry systemic risk and whether a systemic risk regulator is desirable for insurers or other nonbank financial institutions. Grace and Leverty (2012) provide empirical evidence that insurers do not manipulate reserves to avoid solvency monitoring. I extend prior literature by hypothesizing that insurers do not rebalance their portfolio securities when a loss occurs in the prior year and they are in regulatory violation.

[9]The NAIC codified SAP in the Accounting Practices and Procedures Manual. State insurance laws and regulations require insurance companies domiciled in the United States to comply with the guidance provided, except as prescribed or permitted by state law. SAP generally reflects a liquidating (i.e., ability to pay claims) rather than a going concern basis of accounting. For example, SAP requires that deferred policy acquisition costs be expensed immediately instead of matched against the premiums as they are earned and recognized in income. Accordingly, performance measures calculated using SAP numbers typically appear less favorable than those prepared using GAAP numbers.

3. Hypotheses

Prior theory predicts that P&C insurers will use losses to shelter taxable investment income and invest the balance of their portfolio in taxable securities.[10] I hypothesize that P&C insurers with a prior year loss are more likely to rebalance towards taxable investments in the current year. There are several reasons why P&C insurers report losses. For example, the insurer could have had poor underwriting condition cycles or the insurer investment portfolio could have been devalued. Therefore, whether a P&C insurer with losses would decide to shift their tax-free investments to taxable investments is an important issue in the insurance industry since P&C insurers are wary of regulatory intervention and solvency issues. For example, if an insurer suffers losses due to underwriting, these losses present a tax incentive to the insurers by giving the insurer the ability to carry forward these losses to offset future taxable income. Thus insurers have the opportunity to earn higher investment returns through rebalancing to taxable securities that have a higher pre-tax rate of return versus tax-exempt securities of the same level of risk since the higher returns will be shielded by the loss carry forward.

If an insurer suffers losses due to investment, the same tax incentive still applies however, some of the investments that would be sold in the rebalancing may be the same investments that are in a loss position and thus the insurer faces the dilemma of realizing an investment loss today in order to gain future tax benefits. I do not disentangle whether losses are from investment or underwriting because they are most likely due to both. Therefore insurers face opposing incentives: the tax incentive versus the regulatory solvency incentive.

To illustrate this scenario (P&C insurers with a loss in the prior year are more likely to rebalance toward taxable investments in the current year), for example, Pacific Specialty P&C

[10]Cummins and Philips (1994) develop a model of profit maximization incorporating the Tax Reform Act (TRA) of 1986 provisions applicable to P&C insurers.

Co. had a loss in the year 2007 and their taxable security investments divided by the sum of taxable security and non-taxable security investments was 53.67 percent in 2007. In 2008 the insurer increased their taxable securities by 14.91 percent to 68.58 percent. Therefore, based on prior theory, I propose that insurers will be more likely to increase their taxable investment exposure when losses occur in the prior year.

Thus, I test the following hypothesis, stated in alternative form:

H1: P&C insurers with a loss in the prior year are more likely to rebalance toward taxable investments in the current year.

The first hypothesis focuses on P&C insurers that suffered a loss at the start of the financial crisis. I check all insurers that had a loss in 2006 through 2010. Based on prior theories, I propose that P&C insurers will be less likely to rebalance their taxable securities following a prior year loss to take advantage of tax benefits in the current year subsequent to the financial crisis. This is because losses after the crisis are more salient to insurance regulators due to increased scrutiny. Thus if an insurer incurs losses from rebalancing in addition to losses already incurred, there is an increased chance that insurers will face action on the part of regulators since their capital requirements may be at risk. For example, Sheffield Insurance Co. had a loss in the year 2009 and their taxable security investments divided by the sum of taxable security and non-taxable security investments was 18.74 percent in 2009. In 2010 this insurer decreased their taxable securities by 10.40 percent to 8.34 percent.

-Insert Figure 1 here-

The second hypothesis, stated in the alternative form, is:

H2: P&C insurers with a prior year loss are less likely to rebalance towards taxable investments after the financial crisis.

Rebalancing also becomes less likely when insurers' IRIS ratios are in regulatory violation or when P&C insurers could potentially be reviewed by regulators. This type of regulatory scrutiny is self-inflicted by insurers. There is no existing evidence that shows P&C insurers who are in regulatory violation according to the NAIC and have losses from the prior year will rebalance towards taxable securities in the current year. There are prior studies of insurers managing different accounts to avoid regulatory review when they are in regulatory violation, but in this case insurers have tax incentives (from losses) to rebalance even though rebalancing may not help them mask their condition to regulators. Thus there is a conflict between possible future tax savings and current avoidance of regulatory violation. Therefore, I test for evidence that P&C insurers in regulatory violation will rebalance towards taxable securities when the insurer has a loss from the prior year.

To illustrate the scenario that P&C insurers with a prior year loss and with two or three unusual IRIS ratios are less likely to rebalance toward taxable investments, I use the following example. Countryway Insurance Co. had a loss in 2009 and their taxable security investments divided by the sum of taxable security and non-taxable security investments was 89.98 percent in 2009. In 2010 this insurer decreased their taxable securities by 16.11 percent to 73.87 percent. To illustrate my final scenario that P&C insurers with a prior year loss, with four or more unusual IRIS ratios are even less likely to rebalance towards taxable investments, I use the following example. Lighthouse Property Ins. Corp. had a loss in the year 2010 and their taxable security investments divided by the sum of taxable security and non-taxable security investments was 73.62 percent in 2010. In 2011 this insurer decreased their taxable securities by 19.90 percent to 53.72 percent.

-Insert Figure 2, 3, & 4 here-

The third hypothesis, stated in alternative form, is:

H3a: P&C insurers, with two or three unusual IRIS ratios are less likely to rebalance toward taxable investments when a loss occurs in the prior year.

H3b: P&C insurers, with four or more unusual IRIS ratios are even less likely to rebalance towards taxable investments when a loss occurs in the prior year.

4. Research Design

To address the hypotheses stated above, I estimate the following regression model:

$$\boldsymbol{TAX/(TAX + NONTAX)_{i,t}}$$

$$\boldsymbol{= \gamma_0 + \gamma_1 P\_NetLOSS_{i,t} + \gamma_2 POST\_CRISIS_{i,t} + \gamma_3 [P\_NetLOSS_{i,t} \times POST\_CRISIS_{i,t}]}$$

$$\boldsymbol{+ \gamma_4 WEAK\_IRIS\_A_{i,t} + \gamma_5 [P\_NetLOSS_{i,t} \times WEAK\_IRIS\_A_{i,t}] + \gamma_6 WEAK\_IRIS\_B_{i,t}}$$

$$\boldsymbol{+ \gamma_7 [P\_NetLOSS_{i,t} \times WEAK\_IRIS\_B_{i,t}] + \gamma_8 LN\_ASSETS_{i,t} + \gamma_9 DirPREMWRITTEN_{i,t}}$$

$$\boldsymbol{+ \gamma_{10} NetUNDERGAIN_{i,t}}$$

$$\boldsymbol{+ \varepsilon_{i,t}}$$

where,

$\boldsymbol{i}$	=	For all insurers in the property and casualty industry;
$\boldsymbol{t}$	=	For years 2007 to 2011;
$\boldsymbol{TAX/(TAX + NONTAX)}$	=	Earned taxable investment income deflated by the sum of earned taxable investment income plus earned tax-free investment;
$\boldsymbol{P\_NetLOSS}$	=	Dichotomous variable with a value of one if the P&C insurer suffered a loss from the prior year, zero otherwise;
$\boldsymbol{POST\_CRISIS}$	=	Dichotomous variable with a value of one if the year is 2009, 2010, or 2011, zero otherwise;
$\boldsymbol{WEAK\_IRIS\_A}$	=	Dichotomous variable with a value of one if the P&C insurer has four or more unusual IRIS ratios, respectively, zero otherwise [see Petroni, 1992; Gaver and Paterson, 2007];[11,12]
$\boldsymbol{WEAK\_IRIS\_B}$	=	Dichotomous variable with a value of one if the P&C insurer has two or three unusual IRIS ratios, respectively, zero otherwise;
$\boldsymbol{LN\_ASSETS}$	=	Logarithm of net admitted assets;

[11]Petroni, 1992; Gaver and Patterson, 2007 explains the weak IRIS A variable in there Appendix A

[12] IRIS ratios are computed using statutory financial data. Unusual ratios are those that exceed certain bounds specified by the NAIC. Gaver and Paterson (2007) show that managers intentionally understate reserves to avoid IRIS ratio violation.

$\boldsymbol{DirPREMWRITTEN}$ = Direct premium written deflated by the net admitted assets; and

$\boldsymbol{NetUNDERGAIN}$ = Net underwriting gains (losses) deflated by the net admitted assets.

The two effects of the interaction between $\boldsymbol{P\_NetLOSS_{i,t}}$ and $\boldsymbol{POST\_CRISIS_{i,t}}$ may not be merely additive. For example, the effect of being an insurer that has negative net income from the prior year and after the financial crisis could be greater than the sum of their individual contribution. The interaction between $\boldsymbol{P\_NetLOSS_{i,t}}$, and $\boldsymbol{WEAK\_IRIS\_A_{i,t}}$, and $\boldsymbol{WEAK\_IRIS\_B_{i,t}}$ captures that since losses affect insurers' capital requirements, an insurer may be reluctant to recognize losses.

I control for insurer size using net admitted assets (Beaver and McNichols, 1998). Net admitted assets generally include assets that are liquid and whose value can be assessed, or receivables that can reasonably be expected to be paid. Net admitted assets are a critical component for computing capital adequacy to state insurance regulators; they have a much narrower definition than might be applied under GAAP. Certain assets may be accounted for in an insurance company's balance sheet but only net admitted assets are allowed to be counted for purposes of calculating statutory capital or compliance with solvency ratios.[13] I expect a negative relationship between the size of the insurer and the insurer's decision to rebalance their portfolio toward taxable securities. Direct premiums written are commonly used in the P&C insurance industry as a measure of business growth (Adiel, 1996). Therefore, understanding the components of written premiums is necessary to correctly evaluate growth.[14]

Net underwriting gains (losses) are the remains after paying claims and expenses. Insurers generate profits from underwriting and investment income. Prior research has shown

[13]Net admitted assets exclude any valuation allowance. Examples of non-net admitted assets include electronic data processing equipment and software as well as furniture and equipment.

[14]Absent this understanding, a user of written premium information may misinterpret the true growth rate of an insurer, especially during periods of rapid change such as in processing systems or a transition to a different type of business.

that the greater the amount of underwriting risk an insurer assumes, the less risk it can assume in its taxable and tax-free securities. The amount of underwriting risk is believed to be one of the determining factors in this relationship, as the principle purpose of the insurer is to provide insurance coverage for their policyholders (Lambert and Hofflander, 1966.)

5. Data

5.1 Sample Selection

Statutory accounting data was collected from the NAIC files for years 2007-2011. For all hypotheses, insurers must be incorporated inside the United States, and have sufficient data to calculate all the relevant variables (1,245 observations are excluded). My final sample consists of 13,030 insurer-year observations.

-Insert Table 1 here-

5.2 Variable Definitions

My hypotheses require tests of three key variables. For each P&C insurer, I calculate the $\boldsymbol{TAX}/(\boldsymbol{TAX}+\boldsymbol{NONTAX})_{\boldsymbol{i,t}}$ ratio[15]; earned taxable investment income divided by the sum of earned tax-free investment income plus earned taxable investment income. $\boldsymbol{NetINCOME_{i,t}}$[16] is the after tax net income from the statutory insurers' filings. This variable is used to calculate $\boldsymbol{P\_NetLOSS_{i,t}}$ which indicates if the insurers suffered negative prior year net income. Finally, $\boldsymbol{IRIS\_TOTAL_{i,t}}$ is used to help regulators target their resources on riskier insurers. This variable is used to calculate the $\boldsymbol{WEAK\_IRIS\_A_{i,t}}$ and $\boldsymbol{WEAK\_IRIS\_B_{i,t}}$ variables which indicate if the P&C insurer has four (two) or more (three) unusual IRIS ratios, respectively.[17,18]

-Insert Table 2 here-

[15]NAIC – Statutory: Exhibit of Net Investment Income and Exhibit of Capital Gains (Losses) Page.
[16]NAIC – Statutory: Statement of Income Page.
[17]NAIC – Statutory: Liabilities, Surplus, and Other Funds, Statement of Income, Underwriting and Investment Exhibit, Cash Flow, and Exhibit of Net Investment Income Page.
[18]Please refer to Appendix A for guidelines of insurers falling outside usual ranges.

5.3 Descriptive Statistics and Correlation

Table 3 provides descriptive statistics for the 13,030 insurer-year observations. All financial statement variables used in the regressions are calculated using the Belsley-Kuh-Welsch (BKW) test that is based on several measures of influence. The BKW test uses four criteria to identify a data point as an influential outlier (Belsley, Kuh, and Welsch, 1980.) [19] The mean for taxable securities and non-taxable securities are 17,778 (in 000's) and 5,687 (in 000's) which is approximately a 3:1 ratio. The mean for net income is 14,026 (in 000's). The net income for the sample is positive, on average. However, P&C insurers that endured losses could be impacted more by their non-taxable securities because they do not benefit from tax savings.

From an initial glance at the IRIS ratios, the mean and median suggest that a small amount of P&C insurers are in regulatory violation.[20] My results are consistent with Table 4 of Grace and Leverty (2012). However, for P&C insurers that are in regulatory violation, subsequent analysis demonstrates this is meaningful when a P&C insurer decides whether to rebalance its investments toward taxable securities.

-Insert Table 3 here-

Table 4 presents the descriptive statistics of variables used in the analysis. The dependent variable $\boldsymbol{TAX}/(\boldsymbol{TAX}+\boldsymbol{NONTAX})_{\boldsymbol{i,t}}$ indicates that, on average, P&C insurers hold 79.6 percent of their investments in taxable securities. Roughly 20 percent of P&C insurers incur losses. From 2007 to 2008 losses the percentage of P&C insurers with losses increased by 15.01 percent (See Figure 1). The independent variables $\boldsymbol{WEAK\_IRIS\_A_{i,t}}$ and $\boldsymbol{WEAK\_IRIS\_B_{i,t}}$ are 9.5 percent and 36.7 percent, respectively. As I indicated earlier, there are two levels of scrutiny (A and B)

[19]In addition, I winsorized (at the 1% and 99% percentiles) all the variables used in the regressions and obtained similar results.
[20]On average, 11% of US companies have 4 or more ratios that fall outside the usual range (NAIC, 2001).

that a regulator uses in their initial screening assessment. First, Level A indicates the P&C insurer is a high priority review, meaning a more thorough financial examination will be conducted. Second, Level B indicates the P&C insurer may require a review, but an immediate review is not necessary.

-Insert Table 4 here-

A correlation table is presented in Table 5. The correlation between $\boldsymbol{TAX}/(\boldsymbol{TAX} + \boldsymbol{NONTAX})_{i,t}$ and $\boldsymbol{P\_NetLOSS}_{i,t}$ is positive and significant which is consistent with P&C insurers with a prior year loss are more likely to rebalance toward taxable investments. The correlation between $\boldsymbol{TAX}/(\boldsymbol{TAX} + \boldsymbol{NONTAX})_{i,t}$ and $\boldsymbol{WEAK\_IRIS\_A}_{i,t}$ and $\boldsymbol{WEAK\_IRIS\_B}_{i,t}$ are positive and significant, which indicates that P&C insurers that are in regulatory violation are more likely to rebalance toward taxable investments. However, I am more interested in the interactions between $\boldsymbol{WEAK\_IRIS\_A}_{i,t}$, $\boldsymbol{WEAK\_IRIS\_B}_{i,t}$ and $\boldsymbol{P\_NetLOSS}_{i,t}$ and an insurer's $\boldsymbol{TAX}/(\boldsymbol{TAX} + \boldsymbol{NONTAX})_{i,t}$ ratio. For the two variables $\boldsymbol{P\_NetLOSS}_{i,t}$ and $\boldsymbol{P\_NetGAIN}_{i,t}$, there is a significant perfectly negative correlation between the two variables -0.9816, as expected. Hence, I observe the losses and gains separately because of the different interactions with the IRIS ratios.

-Insert Table 5 here-

6. Results

Table 6 presents the results from estimating equation (1). For each regression model (1-4) the coefficient $\boldsymbol{\gamma_1} > 0$, the effect of a loss, is positive and significant, implying that insurers with a loss in the prior year are more likely to rebalance toward taxable investments. Therefore, the null hypothesis stated in H1 is rejected. The economic intuition is that insurers reporting losses should sell tax-free securities and replace them with taxable securities since they can no longer benefit from any tax savings.

To test H2, I observe the coefficient $\boldsymbol{\gamma_3} < 0$ for regression models 3 and 4, which rejects the null hypothesis stated in H2. Despite the fact that, the coefficient $\boldsymbol{\gamma_3}$ is marginally significant it seems like the financial crisis could cause increased regulatory scrutiny which would dissuade insurers from possibly incurring additional losses from rebalancing in addition to losses already incurred. Therefore, the interaction effect between the post financial crisis and losses establishes an incentive to avoid selling non-taxable securities. The main coefficient of interest in model (2) is not statistically significant. Therefore, I fail to reject the null hypothesis stated in H2. When it is not significant in model 2, the coefficient and significance is very similar to the other models.

To test H3a and H3b, I observe the coefficient $\boldsymbol{\gamma_5} < 0$ and $\boldsymbol{\gamma_7} < 0$ for regression models (2, 3 and 4), which rejects the null hypothesis stated in H3a and H3b.[21] Insurers with two or three unusual IRIS ratios are less likely to rebalance toward taxable investments when there is a prior year loss. Insurers with four or more unusual IRIS ratios are even less likely to rebalance toward taxable investments when there is a prior year loss when compared to H3a. Rebalancing toward taxable investments could entail recognizing losses, which insurers may want to avoid because of concerns over the level of their reported capital.

[21]Since, I have a p-value of 0.0574 I can reject the null hypothesis that the variances are equal.

The coefficients $\boldsymbol{\gamma_8} < 0$ and $\boldsymbol{\gamma_9} < 0$ are negative and statistically significant. Insurers that have lower net admitted assets usually rebalance their tax-free securities toward taxable securities.

-Insert Table 6 here-

Overall, the results suggest that insurers with a loss rebalance their tax-free investment securities to taxable investment securities prior to the recent financial crisis, but are less likely to do so after. Conversely, insurers with four (two) or more (three) unusual IRIS ratios are less likely to rebalance towards taxable investments in the current year when a loss occurs in the prior year. Collins, Geisler, and Shackelford (1997) presume that an insurer with a large variance of unusual IRIS ratios has greater exposure to regulatory pressure especially when gains are apparent in the prior year.

Therefore, to test if the model holds for insurers with gains, I estimate the following regression model:

$$\boldsymbol{TAX/(TAX + NONTAX)_{i,t}}$$
$$= \boldsymbol{\beta_0} + \boldsymbol{\beta_1 NetGAIN_{i,t}} + \boldsymbol{\beta_2 POST\_CRISIS_{i,t}} + \boldsymbol{\beta_3}[\boldsymbol{NetGAIN_{i,t}} \times \boldsymbol{POST\_CRISIS_{i,t}}] + \boldsymbol{\beta_4 WEAK\_IRIS\_A_{i,t}}$$
$$+ \boldsymbol{\beta_5}[\boldsymbol{NetGAIN_{i,t}} \times \boldsymbol{WEAK\_IRIS\_A_{i,t}}] + \boldsymbol{\beta_6 WEAK\_IRIS\_B_{i,t}} + \boldsymbol{\beta_7}[\boldsymbol{NetGAIN_{i,t}} \times \boldsymbol{WEAK\_IRIS\_B_{i,t}}]$$
$$+ \boldsymbol{\beta_8 LN\_ASSETS_{i,t}} + \boldsymbol{\beta_9 DirPREMWRITTEN_{i,t}} + \boldsymbol{\beta_{10} NetUNDERGAIN_{i,t}}$$
$$+ \boldsymbol{\eta_{i,t}} \qquad (\mathbf{2})$$

where $\boldsymbol{NetGAIN_{i,t}}$ is an indicator variable with a value of one if the P&C insurer had a net gain from prior year. All other variables are defined in model 1. I find the opposite effect that insurers rebalance their tax-free securities toward taxable securities in the year subsequent to reporting a gain. I estimate that an insurer with a gain in the prior year will rebalance their taxable securities toward tax-free securities in the current year by 10.0 percent. Despite the financial crisis, I find

that insurers that had prior year gains were not affected by the crisis. Specifically, insurers with prior year gains rebalanced their tax-free securities towards taxable securities by 0.4 percent when the insurer was in regulatory violation by Level A and Level B.[22]

-Insert Table 7 here-

[22]Since, I have a p-value of 0.1314 I can accept the null hypothesis that the variances are equal.

7. Sensitivity

Table 8 presents the results from estimating equation (1). To see if my hypotheses will hold in the future for losses and gains, I observe what persists at $\boldsymbol{F\_NetLOSS_{i,t}}$ and $\boldsymbol{F\_NetGAIN_{i,t}}$.

where,

$\boldsymbol{i}$	=	For all insurers in the property and casualty industry;
$\boldsymbol{t}$	=	For years 2007 to 2011;
$\boldsymbol{F\_NetLOSS}$	=	Dichotomous variable with a value of one if the P&C insurer will have a loss in the future year, zero otherwise; and
$\boldsymbol{F\_NetGAIN}$	=	Dichotomous variable with a value of one if the P&C insurer will have a gain in the future year, zero otherwise.

For the regression models (1-4) in Tables 8 the coefficients $\boldsymbol{\gamma_1 > 0}$ and $\boldsymbol{\gamma_3 > 0}$, the effect of a loss is positive and significant, implying that insurers with a loss in the future and post crisis are more likely to rebalance toward taxable investments. The interaction effect between $\boldsymbol{F\_NetLOSS_{i,t}}$ and $\boldsymbol{POST\_CRISIS_{i,t}}$ is positive and significant. Therefore, the financial crisis shows a positive effect when an insurer will have a loss in the future, which suggests that insurers could have over/under reserved their losses if they anticipated the financial crisis. The coefficient $\boldsymbol{\gamma_5 < 0}$ is negative and significant. The results show that insurers with a loss in the future will rebalance their tax-free securities toward taxable securities in the current year after the financial crisis by 5.9 percent; however, this rebalancing strategy declines to 1.8 percent when the insurer is in regulatory violation.

-Insert Table 8 here-

On average, for P&C insurers, I predict gains from both their investments and underwriting in the future. For the regression models (1-4) in Table 9, the coefficients are similar to Table 7. The financial crisis did impact an insurer that incurred gains in the future to rebalance away from taxable securities by 2.4 percent from 6.0 percent. It is noteworthy to mention the coefficient $\boldsymbol{\beta_7}$ is not statistically significant. The financial crisis changes the coefficient results in table 8 and 9 for losses (gains) in the future year. This is shown by the interaction term having the same sign and similar significance to the losses (gains) term in table 6 and 7, respectively. Therefore, I can interpret that insurers are less likely to rebalance their portfolios of investment securities subsequent to the financial crisis and in regulatory violation. This behavior exists regardless of when losses (gains) occur, i.e. whether they occur in the prior or future year.

-Insert Table 9 here-

For stock and non-stock P&C insurers, the results are similar to Table 6. However, non-stock P&C insurers do not rebalance their taxable securities toward tax-free securities when they are in regulatory violation. A possible explanation for this could be based on the public scrutiny of the P&C insurer. For example, regulators have a specified window of time to finish the financial assessment for the insurer. Since non-stock P&C insurers have different regulatory requirements, P&C insurers with gains are sometimes over-looked. I find that stock P&C insurers with losses subsequent to the financial crisis are more likely to increase their ratio of taxable/nontaxable securities by at most 12.5 percent for a panel of approximately 2,800 U.S. firms during the period 2007-2011. However, they are less likely to increase their ratio of

taxable/nontaxable securities when they are in regulatory violation by (3.2) percent.[23] Typically, non-stock P&C insurer owners are policyholders. With non-stock insurers, excess premiums are often returned to the customers at the end of the year. Alternatively, excess premiums are used to adjust future premiums. Most importantly, policyholders have a vote in the insurers operations, which includes asset information. Further, non-stock insurers do not receive the same market pressure requirements as stock P&C insurers from Wall Street to meet or exceed an earnings target. Since non-stock insurers are under less pressure than stock insurers, stock insurers have to accommodate multiple entities (e.g., SEC, NAIC, and state regulators). Therefore, conducting a sensitivity test should shed further light on the incentives identified in my earlier results.

-Insert Table 10 here-

Finally, Table 11 presents the results from estimating equation (1) after removing 2008 and 2009. The results remain significant and similar except for the level B IRIS ratio variable. The coefficient $\boldsymbol{\gamma_5} < 0$ is negative and statistically significant. I find that insurers with losses subsequent to the financial crisis are more likely to increase their ratio of taxable/nontaxable securities by at most 8.8 percent for a panel of approximately 2,800 U.S. firms during the period 2007-2011. However, insurers are more likely to decrease their ratio of taxable/nontaxable securities when they are in regulatory violation by 4.7 percent.

-Insert Table 11 here-

[23]The main difference between a stock insurance company and a non-stock insurance company is that the stock owned company is responsible for making money for the stockholders whereas a non-stock owned company is responsible for making money for the policy holders.

8. Conclusion and Limitations

I examine whether regulatory requirements determine if insurers rebalance their tax-free securities toward taxable securities when a loss occurs, especially after a financial crisis. My analysis of a large sample of P&C insurers indicates that, on average, insurers with a loss in the prior year are more likely to rebalance toward taxable investments in the current year. Thus, being in a regulated environment does not cause insurers to make tax inefficient investment decisions. However, this incentive declines after the financial crisis. My results suggest that increased regulatory scrutiny can decrease the incentive to make tax efficient portfolio decisions. Also, on average, insurers with four (two) or more (three) unusual IRIS ratios are less likely to rebalance toward taxable investments when a loss occurs in the prior year. Thus, the consequences of regulatory violation outweigh the potential future tax savings from portfolio rebalancing.

There are limitations to this study. First, I partitioned the sample based on stock versus non-stock insurers. Stock insurers are under the scrutiny of regulators and the judgment of the capital market, while non-stock P&C insurers are only under scrutiny from regulators. From a regulatory standpoint, this study offers useful information for insurance regulators. I provide empirical evidence for mutual insurers with relatively weak IRIS ratios and how insurers decide to rebalance their tax-free securities towards taxable securities when a loss occurs, especially after a financial crisis. This behavior is not easily noticed by regulators.

In light of this current study, future research is warranted in the area. Bratton (1994) and Gaver and Paterson (2007) suggest that P&C insurers often “manage” loss reserves to reduce the reported number of IRIS ratio violations. Further examining how P&C insurers manage the loss

reserve is an interesting extension of this study.[24] Following Grace and Leverty (2012), a possible extension for this study could be that P&C insurers that manage loss reserves to decrease the reported number of IRIS ratio violations were more likely to do so after the financial crisis, because P&C insurers want to avoid regulatory scrutiny.

[24]For example, Bratton (1994) finds that almost half the insolvent insurers had three or fewer IRIS ratio violations one-year prior.

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Appendix A

INSURANCE REGULATORY INFORMATION SYSTEM (IRIS) RATIO DEFINITIONS and EXPLANATIONS

OVERALL RATIOS

Ratio 1: Gross Premium Written to Policyholders' Surplus.

Explanation:

- Policyholders' surplus provides a cushion for absorbing above-average losses. The Gross Premiums Written to Policyholders' Surplus ratio measures the adequacy of this cushion, without the effects of premiums ceded to reinsurers. The higher the ratio, the more risk the company bears in relation to the policyholders' surplus available to absorb loss variations.

Ratio 2: Net Premium Written to Policyholders' Surplus.

Explanation:

- Same definition as Ratio 1 above (except Net Premiums Written is the variable used).

Ratio 3: Change in Net Premium Written.

Explanation:

- Major increases or decreases in net premiums written indicate a lack of stability in the insurers operations. A large increase in premiums may signal abrupt entry into new lines of business or sales territories. In addition, such an increase in writings may be a sign that the company is attempting to increase cash flow in order to meet loss payments. A large decrease in premiums may indicate the discontinuance of certain lines of business, scaled back writings due to large losses in certain lines, or loss of market share due to competition.

Ratio 4: Surplus Aid to Policyholders' Surplus.

Explanation:

- The use of surplus aid reinsurance treaties may be an indication that company management believes policyholders' surplus to be inadequate. In addition, the continued solvency of companies with a large portion of policyholders' surplus resulting from surplus aid may depend upon the continuing cooperation of the reinsurer.

PROFITABILITY RATIOS

Ratio 5: Two-Year Overall Operating.

Explanation:

- The overall operating ratio is a measure of the profitability of an insurance company. Over the long run, the profitability of the business is a principal determinant of the company's financial stability and solvency.

Ratio 6: Investment Yield.

Explanation:

- Investment yield is a major component of profitability for an insurer. In addition to measuring one important element in profitability, the investment yield also provides an indication of the general quality of the company's investment portfolio.

Ratio 7: Change in Policyholders' Surplus.

Explanation:

- The Change in Policyholders' Surplus is, in a sense, the ultimate measure of the improvement or deterioration in the company's financial condition during the year.

LIQUIDITY RATIOS

Ratio 8: Liabilities to Liquid Assets.

Explanation:

- The ratio of total liabilities to liquid assets is a measure of the company's ability to meet the financial demands that may be placed upon it. It also provides a rough indication of the possible implications for policyholders if liquidation becomes necessary.

Ratio 9: Gross Agents' Balances to Policyholders' Surplus.

Explanation:

- The ratio of agents' balances to policyholders' surplus measures the degree to which solvency of an insurer depends upon an asset that frequently cannot be converted to cash in the event of liquidation. In addition, the ratio is reasonably effective in distinguishing troubled from sound companies.

RESERVES RATIOS

Ratio 10: One-Year Reserve Development to Policyholders' Surplus

Explanation:

- This ratio measures a company's one-year loss reserve development per Schedule P as a percent of prior years' policyholders' surplus. The ratio result indicates the historical accuracy of the estimation of loss reserves.

Ratio 11: Two-Year Reserve Development to Policyholders' Surplus

Explanation:

- The two-year reserve development to policyholders' surplus ratio is the sum of the current reserve for losses incurred more than two years prior plus payments on those losses during the past two years minus the reserves established for those losses two years earlier.

Ratio 12: Estimated Current Reserve Deficiency to Policyholders' Surplus

Explanation:

- This ratio provides an estimate of the adequacy of current reserves.

IRIS Summary			
		Usual Range	
		Minimum	Maximum
Ratio 1	Gross Premium Written to Policyholders' Surplus	0	900
Ratio 2	Net Premium Written to Policyholders' Surplus	0	300
Ratio 3	Change in Net Premium Written	-33	33
Ratio 4	Surplus Aid to Policyholders' Surplus	0	15
Ratio 5	Two-Year Overall Operating Ratio	0	100
Ratio 6	Investment Yield	5	10
Ratio 7	Change in Policyholders' Surplus	(10)	50
Ratio 8	Liabilities to Liquid Assets	0	105
Ratio 9	Gross Agents' Balances to Policyholders' Surplus	0	40
Ratio 10	One-Year Reserve Development to Policyholders' Surplus	0	20
Ratio 11	Two-Year Reserve Development to Policyholders' Surplus	0	20
Ratio 12	Estimated Current Reserve Deficiency to Policyholders' Surplus	0	25

GAINS vs. LOSSES

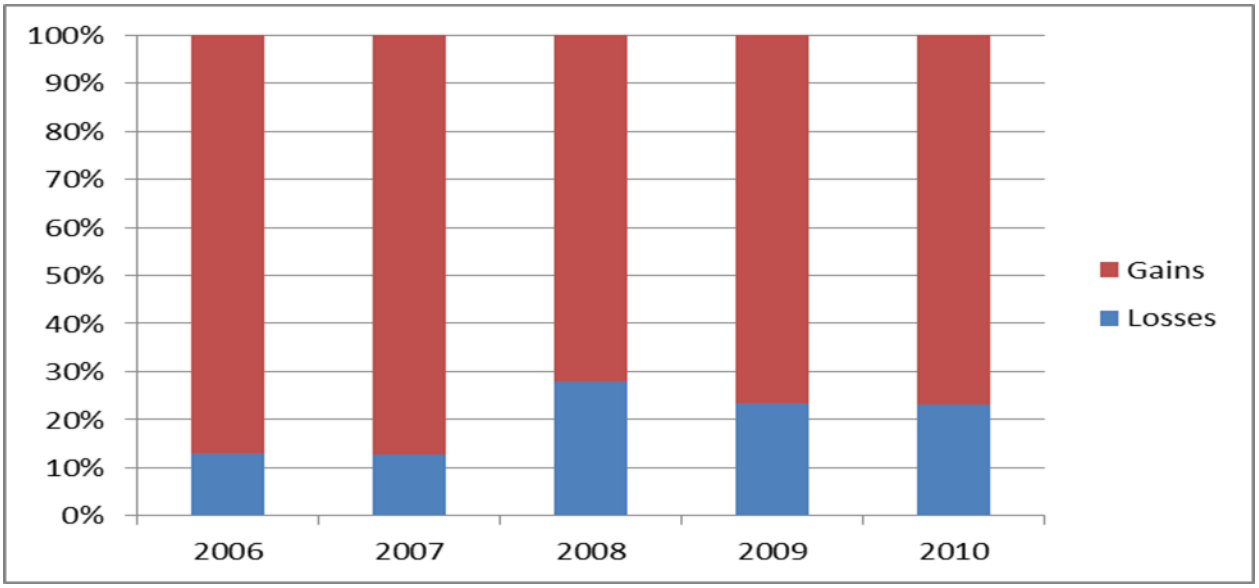

Figure 1. This figure displays the indicator variables averages for gains and losses by year. The sample is drawn from 2006-2010 and it includes observations of insurers reporting data from the NAIC.

NO WEAK IRIS vs. WEAK IRIS

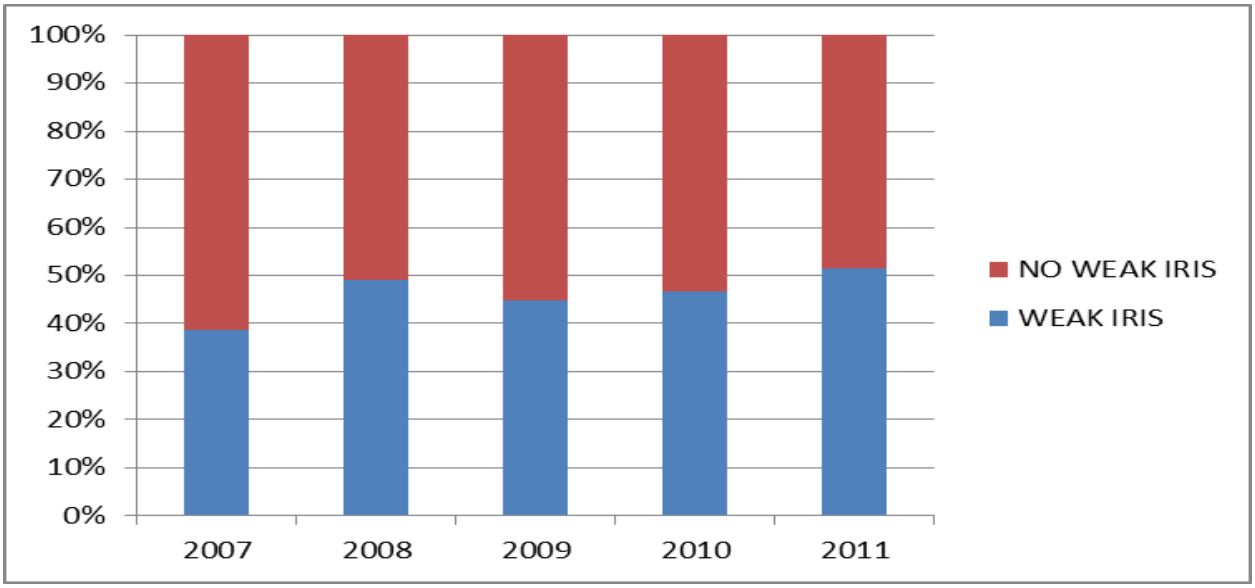

Figure 2. This figure displays the indicator variables averages for insurers with no weak IRIS ratio and for insurers with weak IRIS ratios (WEAK B and WEAK A) insurers that exceed certain bounds (using IRIS ratios) of 2 or more by year. The sample is drawn from 2007-2011 and it includes observations of insurers reporting data from the NAIC.

WEAK B vs. WEAK A

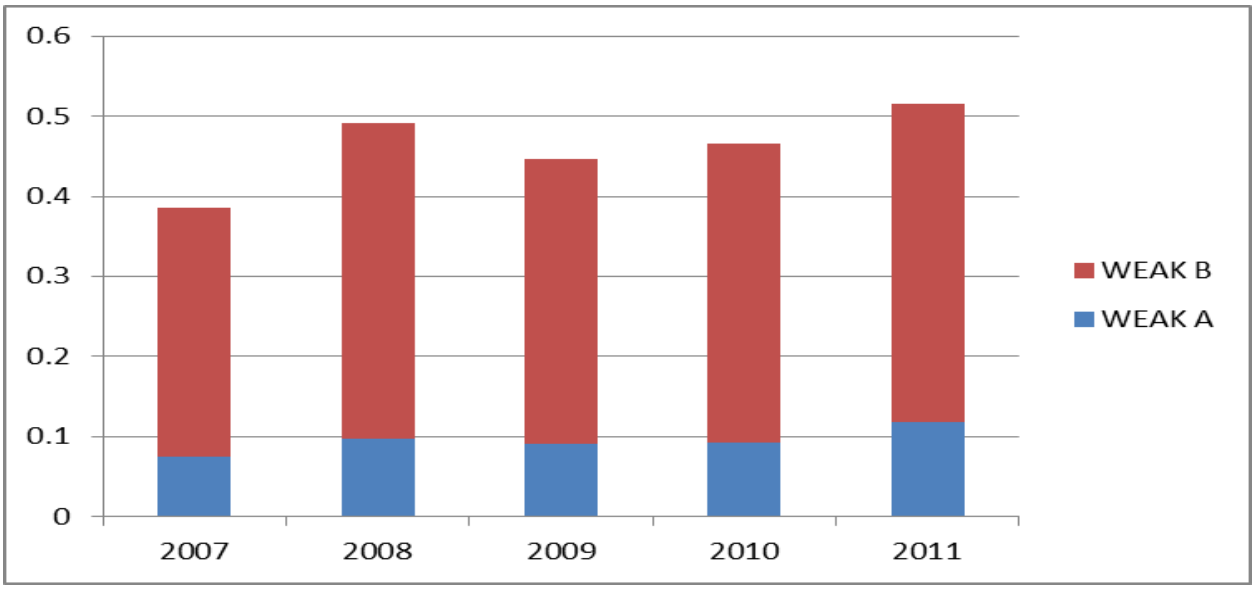

Figure 3. This figure displays the indicator variables averages for insurers with weak IRIS ratio that may require and review from regulators (WEAK B) and for insurers with weak IRIS ratios that are a high priority for review (WEAK A) by year. The sample is drawn from 2007-2011 and it includes observations of insurers reporting data from the NAIC.

NO WEAK IRIS vs. WEAK B vs. WEAK A

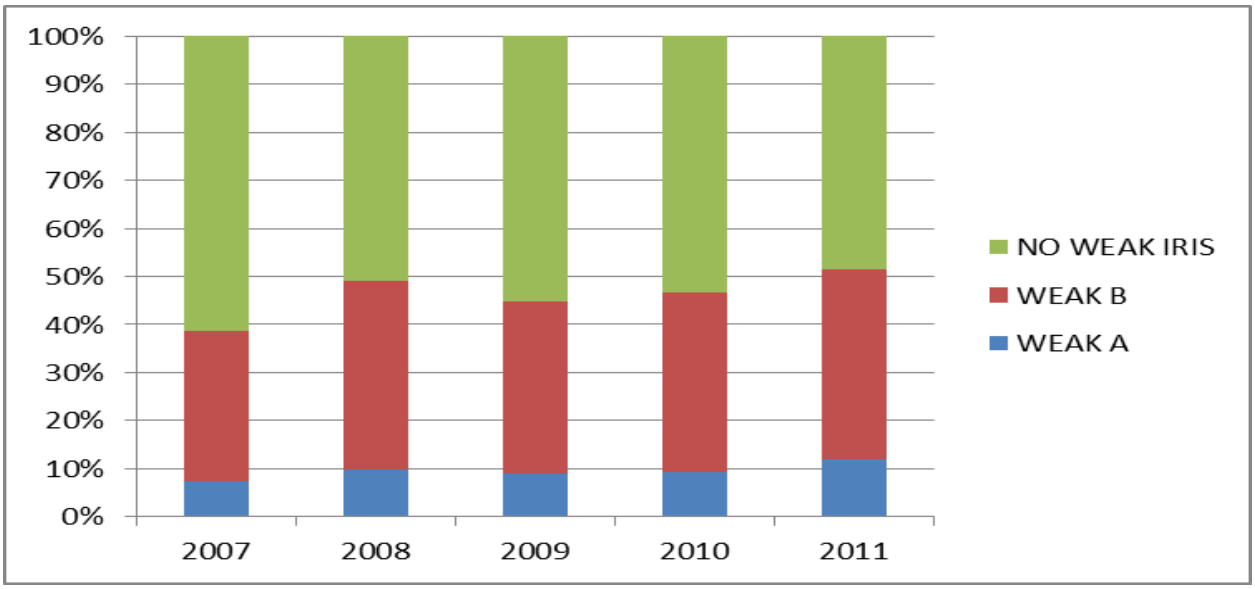

Figure 4. This figure displays the indicator variables averages for insurers with no weak IRIS ratios, for insurers with weak IRIS ratio that may require a review from regulators (WEAK B), and for insurers with weak IRIS ratios that are a high priority for review (WEAK A) by year. The sample is drawn from 2007-2011 and it includes observations of insurers reporting data from the NAIC.

Table 1

Sample Selection Criteria

Insurers in the 2007-2011 NAIC property–casualty database	14,275
Less:	
Insurers incorporated outside of the US	(70)
Insurers with insufficient data to calculate control variables	(1,175)
Sample for testing H1, H2,H3a, & H3b:	**13,030**

This table describes the sample construction procedures. The table begins with National Association of Insurance Commission (NAIC) data. The sample includes 14,275 insurer-year observations for 2007-2011. To test H1-H3b, I removed 70 insurer-year observations that are incorporated outside the United States and 1,175 insurer-year observations that had insufficient data to calculate the control variables I used in this study.

Table 2
Variable Definitions

Variable		Definition
Taxable Securities	=	Investments that insurers are subject to tax.
Non-Taxable Securities	=	Investments that insurers are not subject to taxes.
TAX / (TAX+NONTAXABLE)	=	The ratio of the Taxable Securities divided by the sum of Taxable Securities plus Non-Taxable Securities.
NetINCOME	=	Defined as the total net income after taxes for insurers.
P_NetLOSS	=	Indicator variable with a value of one if an insurer suffered a loss in the prior year and zero otherwise.
P_NetGAIN	=	Indicator variable with a value of one if an insurer had a gain in the prior year and zero otherwise.
F_NetLOSS	=	Indicator variable with a value of one if an insurer will have a loss in the future year and zero otherwise.
F_NetGAIN	=	Indicator variable with a value of one if an insurer will have a gain in the future year and zero otherwise.
POST_CRISIS	=	Indicator variable with a value of one if year is 2009, 2010, or 2011, zero otherwise.
WEAK_IRIS_A	=	Indicator variable with a value of one if the insurer has four or more unusual Insurance Regulatory Information Systems (IRIS) ratios, zero otherwise.
WEAK_IRIS_B	=	Indicator variable with a value of one if the insurer has two or three unusual Insurance Regulatory Information Systems (IRIS) ratios, zero otherwise.
IRIS_TOTAL	=	Ratios are computed using statutory accounting statement data. Unusual ratios are those that exceed certain bounds specified by the National Association of Insurance Commissioners (NAIC).
NetADMASSETS	=	Assets that are liquid and whose value can be assessed, or receivables that can be expected to be paid.
LN_ASSETS	=	Logarithm value of net admitted assets.

Table 2 (Continued)
Variable Definitions

Direct Premium Written	=	Defined as the direct premium written for insurers.
DirPREMWRITTEN	=	Direct premium written by an insurer scaled by net admitted assets.
Net Underwriting Gains (Losses)	=	Defined as the net underwriting gains (losses) for insurers.
NetUNDERGAIN	=	Net underwriting gains (losses) scaled by net admitted assets.

Table 3
Descriptive statistics for the sample of 13,030 insurer-year observations

Property & Casualty Variables	Mean	Standard Dev.	Median	Minimum	Maximum
Taxable Securities (in 000's)	$17,777.71	120,457.20	$1,062.46	($3,155.78)	$5,460,621.00
Non-Taxable Securities (in 000's)	$5,686.73	35,023.66	$85.10	($446.50)	$996,727.50
Independent and Control Variables for H1, H2, H3a, & H3b					
NetADMASSETS (in 000's)	$623,348.60	3,626,100.00	$53,838.48	$127.18	$115,000,000.00
NetINCOME (in 000's)	$14,025.50	155,603.40	$750.23	($4,815,623.00)	$6,079,272.00
Direct Premium Written (in 000's)	$184,902.00	840,845.90	$24,899.33	($18,257.02)	$30,400,000.00
Net Underwriting Gains (Losses) (in 000's)	($3,082.73)	113,361.80	$0.00	($4,743,695.00)	$2,369,631.00
IRIS_TOTAL	1.81	1.32	1.00	0.00	11.00

Table 4
Descriptive Statistics of Variables used in Analyses

	count	mean	min	p50	max
TAX / (TAX+NONTAXABLE)	13,030	0.796	-2.416	0.921	3.234
P_NetLOSS	13,042	0.200	0.000	0.000	1.000
P_NetGAIN	13,042	0.793	0.000	1.000	1.000
POST_CRISIS	13,042	0.610	0.000	1.000	1.000
WEAK_IRIS_A	13,042	0.095	0.000	0.000	1.000
WEAK_IRIS_B	13,042	0.367	0.000	0.000	1.000
LN_ASSETS	13,042	11.044	4.846	10.894	18.564
DirPREMWRITTEN	13,042	0.973	-0.060	0.413	65.439
NetUNDERGAIN	13,042	-0.008	-12.204	0.000	1.555
Observations	**13,030**				

Table 5
Correlation Table

	TAX / (TAX+ NON TAXABLE)	*NetLOSS*	*NetGAIN*	*POST_CRISIS*	*WEAK_IRIS_A*	*WEAK_IRIS_B*	*LN_ASSETS*	*DirPREM WRITTEN*	*NetUNDERGAIN*
TAX / (TAX+NONTAXABLE)	**1.0000**								
P_NetLOSS	0.1664	**1.0000**							
	(0.0000)								
P_NetGAIN	-0.1738	-0.9814	**1.0000**						
	(0.0000)	(0.0000)							
POST_CRISIS	-0.0420	0.1436	-0.1416	**1.0000**					
	(0.0000)	(0.0000)	(0.0000)						
WEAK_IRIS_A	0.1293	0.2845	-0.2991	0.0236	**1.0000**				
	(0.0000)	(0.0000)	(0.0000)	(0.0070)					
WEAK_IRIS_B	0.0686	0.1975	-0.1981	0.0227	-0.2468	**1.0000**			
	(0.0000)	(0.0000)	(0.0000)	(0.0096)	(0.0000)				
LN_ASSETS	-0.3447	-0.1288	0.1374	-0.0014	-0.0553	-0.0602	**1.0000**		
	(0.0000)	(0.0000)	(0.0000)	(0.8747)	(0.0000)	(0.0000)			
DirPREM WRITTEN	-0.0496	-0.0136	-0.0031	-0.024	0.0439	0.0033	-0.0967	**1.0000**	
	(0.0000)	(0.1205)	(0.7241)	(0.0060)	(0.0000)	(0.7054)	(0.0000)		
NetUNDERGAIN	-0.0723	-0.3141	0.3141	-0.1400	-0.2708	-0.1792	0.0840	0.0184	**1.0000**
	(0.0074)	(0.0000)	(0.0000)	(0.0000)	(0.0000)	(0.0000)	(0.0000)	(0.0358)	

* p-value are in parentheses

Table 6

Results of Estimation of the Effects of Prior Year Losses, Post Crisis, and Regulatory Violation on Taxable Securities divided by the sum of Taxable Securities plus Non-Taxable Securities

		TAX / (TAX+NONTAXABLE)			
	Pred. Sign	Model (1)	Model (2)	Model (3)	Model (4)
		b/t	b/t	b/t	b/t
Intercept		1.116***	1.110***	1.110***	1.010***
		(46.87)	(46.47)	(45.98)	(45.16)
P_NetLOSS	+	0.085***	0.082***	0.103***	0.099***
		(10.12)	(9.31)	(9.78)	(8.23)
POST_CRISIS	-	-0.033***	-0.033***	-0.033***	-0.033***
		(-9.63)	(-9.63)	(-9.51)	(-9.48)
P_NetLOSS X POST_CRISIS	-	-0.017*	-0.015	-0.016*	-0.016*
		(-1.80)	(-1.60)	(-1.74)	(-1.65)
WEAK_IRIS_A	+		0.080***		0.091***
			(6.48)		(6.48)
P_NetLOSS X WEAK_IRIS_A	-		-0.053***		-0.070***
			(-3.36)		(-3.90)
WEAK_IRIS_B	+			0.023***	0.031***
				(3.19)	(4.05)
P_NetLOSS X WEAK_IRIS_B	-			-0.043***	-0.039***
				(-3.60)	(-2.96)
LN_ASSETS	-	-0.028***	-0.027***	-0.028***	-0.027***
		(-13.00)	(-12.92)	(-13.05)	(-12.90)
DirPREMWRITTEN	-	-0.009***	-0.010***	-0.010***	-0.010***
		(-4.01)	(-4.05)	(-4.24)	(-4.35)
NetUNDERGAIN	+	-0.005	0.013	-0.002	0.017
		(-0.36)	(0.69)	(-0.12)	(0.80)
Company Indicators		Yes	Yes	Yes	Yes
F		92.67	70.77	70.32	57.58
R-square		0.0716	0.0757	0.0732	0.0780
Number of Observations		13030	13030	13030	13030

* p<0.10 ** p<0.05 *** p<0.01

Table 7
Results of Estimation of the Effects of Prior Year Gains, Post Crisis, and Regulatory Violation on Taxable Securities divided by the sum of Taxable Securities plus Non-Taxable Securities

		TAX / (TAX+NONTAXABLE)			
	Pred. Sign	Model (1)	Model (2)	Model (3)	Model (4)
		b/t	b/t	b/t	b/t
Intercept		1.200***	1.191***	1.214***	1.198***
		(53.39)	(52.34)	(52.05)	(48.51)
P_NetGAIN	-	-0.087***	-0.082***	-0.106***	-0.100***
		(-10.27)	(-9.27)	(-10.15)	(-8.38)
POST_CRISIS	-	-0.050***	-0.048***	-0.049***	-0.048***
		(-6.26)	(-5.97)	(-6.14)	(-5.97)
P_NetGAIN X POST_CRISIS	+	0.017*	0.015	0.016*	0.015
		(1.82)	(1.58)	(1.74)	(1.64)
WEAK_IRIS_A	+		0.029**		0.022
			(2.34)		(1.51)
P_NetGAIN X WEAK_IRIS_A	+		0.047***		0.064***
			(2.99)		(3.60)
WEAK_IRIS_B	+			-0.022**	-0.009
				(-2.21)	(-0.78)
P_NetGAIN X WEAK_IRIS_B	+			0.046***	0.040***
				(3.85)	(2.96)
LN_ASSETS	-	-0.027***	-0.027***	-0.028***	-0.027***
		(-12.92)	(-12.85)	(-12.98)	(-12.84)
DirPREMWRITTEN	-	-0.009***	-0.009***	-0.010***	-0.010***
		(-4.08)	(-4.10)	(-4.31)	(-4.38)
NetUNDERGAIN	+	-0.004	0.013	-0.001	0.017
		(-0.31)	(0.68)	(-0.07)	(0.79)
Company Indicators		Yes	Yes	Yes	Yes
F		91.82	69.77	70.09	57.18
R-square		0.0724	0.076	0.0742	0.0783
Number of Observations		13030	13030	13030	13030

* p<0.10 ** p<0.05 *** p<0.01

Table 8
Results of Estimation of the Effects of Future Year Losses, Post Crisis, and Regulatory Violation on Taxable Securities divided by the sum of Taxable Securities plus Non-Taxable Securities

		TAX / (TAX+NONTAXABLE)			
	Pred. Sign	Model (1)	Model (2)	Model (3)	Model (4)
		b/t	b/t	b/t	b/t
Intercept		1.142***	1.133***	1.135***	1.121***
		(46.80)	(46.01)	(45.46)	(44.07)
F_NetLOSS	+	0.045***	0.045***	0.046***	0.040***
		(5.42)	(5.29)	(4.72)	(3.81)
POST_CRISIS	-	-0.036***	-0.036***	-0.036***	-0.036***
		(-9.61)	(-9.58)	(-9.62)	(-9.59)
F_NetLOSS X POST_CRISIS	+	0.020**	0.020**	0.020**	0.019**
		(2.11)	(2.11)	(2.08)	(2.01)
WEAK_IRIS_A	+		0.083***		0.094***
			(6.17)		(6.49)
F_NetLOSS X WEAK_IRIS_A	-		-0.047***		-0.041***
			(-2.56)		(-2.06)
WEAK_IRIS_B	+			0.018**	0.027***
				(2.17)	(3.09)
F_NetLOSS X WEAK_IRIS_B	-			-0.008	-0.000
				(-0.67)	(0.03)
LN_ASSETS	-	-0.030***	-0.030***	-0.030***	-0.029***
		(-13.80)	(-13.61)	(-13.72)	(-13.42)
DirPREMWRITTEN	-	-0.009***	-0.009***	-0.010***	-0.010***
		(-4.14)	(-4.17)	(-4.31)	(-4.42)
NetUNDERGAIN	+	-0.002	0.030	-0.000	0.041
		(-0.09)	(1.04)	(-0.00)	(1.23)
Company Indicators		Yes	Yes	Yes	Yes
F		77.30	62.91	59.09	51.40
R-square		0.0756	0.0805	0.0765	0.0828
Number of Observations		10335	10335	10335	10335

* p<0.10 ** p<0.05 *** p<0.01

Table 9
Results of Estimation of the Effects of Future Year Gains, Post Crisis, and Regulatory Violation on Taxable Securities divided by the sum of Taxable Securities plus Non-Taxable Securities

		TAX / (TAX+NONTAXABLE)			
	Pred. Sign	Model (1)	Model (2)	Model (3)	Model (4)
		b/t	b/t	b/t	b/t
Intercept		1.190***	1.178***	1.182***	1.160***
		(50.81)	(49.76)	(50.03)	(47.46)
F_NetGAIN	-	-0.047***	-0.046***	-0.049***	-0.041***
		(-5.69)	(-5.41)	(-5.06)	(-3.91)
POST_CRISIS	-	-0.016**	-0.016**	-0.016**	-0.017**
		(-2.16)	(-2.14)	(-2.20)	(-2.29)
F_NetGAIN X POST_CRISIS	-	-0.020**	-0.020**	-0.020**	-0.019**
		(-2.07)	(-2.10)	(-2.05)	(-2.00)
WEAK_IRIS_A	+		0.038***		0.055***
			(2.78)		(3.56)
F_NetGAIN X WEAK_IRIS_A	+		0.042**		0.036*
			(2.31)		(1.82)
WEAK_IRIS_B	+			0.008	0.027***
				(0.95)	(2.79)
F_NetGAIN X WEAK_IRIS_B	+			0.010	-0.000
				(0.86)	(-0.03)
LN_ASSETS	-	-0.030***	-0.030***	-0.030***	-0.029***
		(-13.74)	(-13.57)	(-13.67)	(-13.38)
DirPREMWRITTEN	-	-0.010***	-0.010***	-0.010***	-0.010***
		(-4.20)	(-4.20)	(-4.37)	(-4.44)
NetUNDERGAIN	+	-0.000	0.031	-0.001	0.042
		(-0.02)	(1.06)	(-0.06)	(1.23)
Company Indicators		Yes	Yes	Yes	Yes
F		77.80	62.84	59.57	51.37
R-square		0.0763	0.0808	0.0772	0.0831
Number of Observations		10335	10335	10335	10335

* p<0.10 ** p<0.05 *** p<0.01

Table 10

Results of Estimation of the Effects of Prior Year Losses, Post Crisis, and Regulatory Violation on Taxable Securities divided by the sum of Taxable Securities plus Non-Taxable Securities (Stock vs. Non-Stock)

	Pred. Sign	Model (1)	Model (2)
		b/t	b/t
Intercept		1.034***	1.138***
		(30.76)	(35.83)
P_NetLOSS	+	0.125***	0.044**
		(8.08)	(2.41)
POST_CRISIS	-	-0.036***	-0.019***
		(-8.55)	(-3.42)
P_NetLOSS X POST_CRISIS	-	-0.021*	-0.014
		(-1.71)	(-1.05)
WEAK_IRIS_A	+	0.078***	0.091***
		(4.50)	(5.09)
P_NetLOSS X WEAK_IRIS_A	-	-0.069***	-0.037
		(-2.93)	(-1.47)
WEAK_IRIS_B	+	0.032***	0.040**
		(3.49)	(2.91)
P_NetLOSS X WEAK_IRIS_B	-	-0.057***	-0.010
		(-3.46)	(-0.47)
LN_ASSETS	-	-0.023***	-0.027***
		(-8.08)	(-9.40)
DirPREMWRITTEN	-	-0.010***	-0.006
		(-4.21)	(-1.26)
NetUNDERGAIN	+	-0.004	0.113*
		(-0.28)	(1.79)
Company Indicators		Yes	Yes
F		35.66	23.79
R-square		0.0591	0.1081
Number of Observations		9310	3720

* p<0.10 ** p<0.05 *** p<0.01

Table 11
Results of Estimation of the Effects of Prior Year Losses, Post Crisis, and Regulatory Violation on Taxable Securities divided by the sum of Taxable Securities plus Non-Taxable Securities (2008 & 2009 Removed)

		TAX / (TAX+NONTAXABLE)			
	Pred. Sign	Model (1)	Model (2)	Model (3)	Model (4)
		b/t	b/t	b/t	b/t
Intercept		1.090***	1.085***	1.085***	1.075***
		(46.61)	(46.20)	(45.71)	(45.00)
P_NetLOSS	+	0.097***	0.091***	0.112***	0.088***
		(10.01)	(8.75)	(9.28)	(5.30)
POST_CRISIS	-	-0.042***	-0.043***	-0.043***	-0.044***
		(-10.14)	(-10.21)	(-10.28)	(-10.43)
P_NetLOSS X POST_CRISIS	-	-0.014	-0.013	-0.012	-0.013
		(-1.19)	(-1.12)	(-0.99)	(-1.13)
WEAK_IRIS_A	+		0.083***		0.092***
			(6.02)		(6.44)
P_NetLOSS X WEAK_IRIS_A	-		-0.044**		-0.041*
			(-2.33)		(-1.77)
WEAK_IRIS_B	+			0.021**	0.029***
				(2.60)	(3.41)
P_NetLOSS X WEAK_IRIS_B	-			-0.039**	-0.013
				(-2.70)	(-0.72)
LN_ASSETS	-	-0.024***	-0.024***	-0.024***	-0.024***
		(-11.70)	(-11.61)	(-11.67)	(-11.53)
DirPREMWRITTEN	-	-0.009***	-0.009***	-0.009***	-0.010***
		(-4.09)	(-4.13)	(-4.32)	(-4.41)
NetUNDERGAIN	+	-0.007	0.010	-0.004	0.015
		(-0.63)	(0.62)	(-0.34)	(0.74)
Company Indicators		Yes	Yes	Yes	Yes
F		88.62	69.02	67.38	56.01
R-square		0.0704	0.0752	0.0718	0.0773
Number of Observations		7843	7843	7843	7843

* p<0.10 ** p<0.05 *** p<0.01

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