Taking Shadow Insurance Out of the Shadows:
Regulatory Arbitrage, Taxes, and Capital

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Abstract: Recent reports highlight life insurance firms' widespread use of shadow insurance, a complicated series of accounting techniques, to free up liquid assets typically held as reserves to pay policy claims. Aggregate shadow insurance at the end of our sample period is $348 billion, and critics contend that shadow insurance is *tax-motivated* and allows firms to free up cash for shareholder payouts, investment, and compensation. They argue this practice induces tremendous financial risk and puts the larger economy at risk. Proponents counter that shadow insurance offers relief from exorbitant and unnecessary capital restrictions. We examine shadow insurance firms' behavior from three angles: corporate tax behavior, payout policy, and executive cash compensation. We find that shadow insurance arrangements are concentrated in tax haven subsidiaries and are associated with significant tax savings: a one standard deviation increase in haven (domestic) shadow insurance usage is associated with an effective tax rate reduction of 3.72 (2.67) percentage points, which equates to $119 ($85) million in tax savings for the average public firm in our sample. We also find that shadow insurance use is associated with significantly greater cash payouts to shareholders and executives.

Keywords: tax avoidance; payout policy; executive compensation; shadow insurance

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1. Introduction

Recent media reports highlight life insurance firms' use of complicated accounting techniques to both avoid billions in federal income taxes while freeing up cash typically held in reserve to pay out insurance claims and annuity distributions (Walsh 2014, 2015). These accounting structures, dubbed "shadow insurance," have grown out of intense competition among jurisdictions, such as U.S. states, vying to attract business by allowing firms to structure arrangements that free up cash while reporting their reserves as unchanged. Critics contend that this practice induces tremendous financial risk and argue that "there is no sound policy reason for [taxpayers]" to subsidize life insurers in this way (Walsh 2014). Proponents counter that shadow insurance offers relief from exorbitant and redundant capital restrictions (e.g., M Financial Group 2013).

We contribute to this debate by investigating firm-level consequences of shadow insurance usage. Media reports suggest shadow insurance facilitates tax savings opportunities and that firms can use freed-up cash for shareholder payouts, investment, and compensation (e.g., NYDFS 2013; Walsh 2014). Consistent with these claims, we examine shadow insurance firms' behavior from three angles: corporate tax behavior, payout policy, and executive cash compensation.

Shadow insurance transactions are derived from the reinsurance business. With reinsurance, the insurer pays another company to cover its obligations to pay claims. The obligation is then removed from the books of the insurer and picked up by the independent reinsurer. However, unaffiliated reinsurance is expensive and the supply of capital for reinsurance is limited (Koijen and Yogo 2016). As a consequence, some life insurance firms have turned to the use of shadow insurance. With shadow insurance, the life insurer creates a wholly-owned subsidiary known as a "captive" to reinsure their obligations. The life insurance obligations are placed into the wholly-owned subsidiary along with sufficient capital to meet regulatory requirements—required by the captive's state or jurisdiction— to cover potential claims. The contributed capital is typically high quality assets like bonds (Walsh 2014).

Transferring the risk to captive reinsurers allows the parent insurer to reduce required reserves because firms are not required to reserve against reinsured risks, even if the reinsurer is affiliated (Schwarcz and Schwarcz 2014). Moreover, with no binding federal insurance regulator, insurers can set up the captive reinsurers in any of the U.S. states or in a foreign jurisdiction, which use leniency in regulatory capital criteria to compete for insurance business (Walsh and Story 2011). The result of this decentralized regulatory environment is significant variation in how certain assets are treated for statutory purposes. The transfer of capital allows the firm to retain a federal tax deduction associated with the reserve capital since the reserves are maintained within the corporate family. Taking advantage of this competition, insurers complete the shadow insurance arrangement by issuing an intercompany receivable, which likely has limited market value, to the captive firm headquartered in a jurisdiction that recognizes the asset for regulatory capital purposes. With the receivable counting towards regulatory capital criteria, the parent can then extract high quality assets from the captive and use them in other ways.[1]

Investigating firm behavior associated with the use of shadow insurance is important for three primary reasons. First, although ostensibly used as a tool to manage capital, media reports suggest that tax incentives comprise a primary motivation for shadow insurance, with claims of potential tax savings as high as $100 billion (Walsh 2014). In March 2014, New York regulators offered to roll back reserve requirements by 35 percent if firms would agree not to engage in

[1] Appendix A describes an example of a shadow insurance transaction. We discuss both the mechanics of shadow insurance transactions and the tax rules in more detail in Section 2.

shadow insurance arrangements (i.e., reinsure obligations through subsidiaries in other states). Given firms' complaints that regulatory capital standards were excessive, they expected life insurers to line up to take the offer. After not a single insurance firm took the offer, Benjamin Lawsky, former superintendent of the New York Department of Financial Services (NYDFS), inferred that the firms "had to look as if they were setting up oversize reserves to get the commensurate federal tax break. That done, they could recover the 'excess' unseen, in the privacy of their special-purpose subsidiaries" (Walsh 2014). Despite these claims, prior research has not examined whether, or the extent to which, firms using shadow insurance are indeed associated with greater tax avoidance. Notably, the fact that the IRS, external auditors, and actuaries review shadow insurance arrangements (Walsh 2014) likely deters aggressive tax and capital management activities. Thus, the association between shadow insurance and tax avoidance is unclear.

Second, in 2013 the NYDFS issued a report arguing that shadow insurance transactions represented "financial alchemy" and artificially inflate reported reserves (NYDFS 2013). Apart from the general concerns surrounding financial reporting transparency to investors and creditors (e.g., Dechow et al. 2010; Graham et al. 2005; and Leuz and Wysocki 2008), the National Association of Insurance Commissioners (NAIC) indicates that the "ability to effectively determine relative financial condition using financial statements is [also] of paramount importance to the protection of *policyholders*" (NAIC 2014). Thus, shadow insurance introduces an unconventional agency conflict between shareholders and policyholders by allowing firms to divert capital away from reserves that may be needed to pay policy claims. Our analysis provides insight into the role tax avoidance plays in motivating the growing use of shadow insurance.

Third, given insurance firms' central role in the economy, studying the use of shadow insurance is also important from a policy perspective. Estimates suggest that, at its height before the financial crisis, shadow banking in the banking sector exceeded $500 billion (Adrian and Aschraft 2012). Consistent with recent research documenting tremendous growth in shadow insurance—we estimate aggregate shadow insurance grew from $127 billion in 2006 to $348 billion in 2013[2]—the NYDFS (2013, 1) report warns that shadow insurance "could potentially put the stability of the broader financial system at greater risk" and "is reminiscent of certain practices used in the run up to the financial crisis." However, estimates in Koijen and Yogo (2016) suggest that shadow insurance also significantly increases annual life insurance that the industry underwrites and reduces the cost of insurance coverage for policyholders. Importantly, our aim is to provide evidence on the firm-level consequences of shadow insurance, but we do not attempt to quantify the net social benefits or costs that shadow insurance provides.

To investigate our research questions, we use firm-level regulatory and financial reports filed with the National Association of Insurance Commissioners (NAIC) to identify the incidence and extent of individual firms' use of shadow insurance in different periods. To examine potential consequences of shadow insurance (i.e., tax avoidance, payout policy, executive cash compensation), we model the decision to use shadow insurance and use a two-step Heckman (1979) correction to mitigate the potential effects of self-selection bias in firms' choosing to use shadow insurance. We find tax avoidance is increasing in shadow insurance usage, with shadow insurance placement and the most pronounced tax avoidance effects concentrated in tax haven countries, consistent with a tax-savings motivation. We also find that dividend payouts and executive cash (but not equity) compensation are increasing in shadow insurance usage. Overall, we provide evidence consistent with shadow insurance generating significant tax savings and freeing up capital to pay to shareholders and executives.

[2] Koijen and Yogo (2016) report similar magnitudes, with estimated shadow insurance of $364 billion in 2012.

Although the tax avoidance literature provides considerable evidence on various determinants of tax avoidance behavior (e.g. Dyreng et al. 2010), we have only a limited understanding of *how* firms generate tax savings. Recent research highlights firms' significant income shifting activities (e.g., Klassen and Laplante 2012) and widespread political and media responses to inversion efforts (Marples and Gravelle 2014). This study contributes to the literature by highlighting a specific mechanism—shadow insurance—and quantifying the tax savings associated with life insurance firms use of shadow insurance.

Hanlon and Heitzman (2010) call for research that studies the real effects of tax avoidance. This study contributes to the tax avoidance literature (e.g., Bird et al. 2015; Graham et al. 2011; Dyreng et al. 2016; Shevlin 1987; Williams 2015) by highlighting real effects associated with tax avoidance techniques among life insurers. Specifically, our results suggest tax avoidance is likely an important determinant of the use of shadow insurance that in turn leads to potential agency conflicts between shareholders and policyholders. Our results are consistent with regulator claims that firms may be hesitant to support changes in reserve requirements that would eliminate the need for shadow insurance because of concern over losing the tax benefits of shadow insurance (e.g, Walsh 2014).

Finally, this study contributes to the literature examining trade-offs between financial reporting, tax, and regulatory capital considerations (e.g., Collins et al. 1995; Beatty et al. 1995) by highlighting firms' use of shadow insurance, which both satisfies regulatory capital standards, facilitates tax avoidance activities, and is associated with greater shareholder and executive cash payouts.

2. Background on Shadow Insurance

The NAIC is the organization responsible for setting standards and offering regulatory support in the U.S. (see, for example, naic.org). The chief insurance regulators from the 50 states, the District of Columbia, and five U.S. territories govern the NAIC, which sets statutory accounting principles that are the basis for insurance accounting. In January of 2000 and 2003, the NAIC adopted Regulations XXX and AXXX, respectively. These new regulations significantly increased reserve requirements for life insurers. Although individual states regulate insurance firms domiciled in their state, all states require life insurers to file statutory financial statements with the insurance commissioner. The XXX and AXXX regulations relate to statutory reserve requirements, not generally accepted accounting principles (GAAP). The reserve requirements under GAAP are smaller and closer to economic reserve requirements (expected losses from claims). Most shadow insurance transactions are designed to circumvent what the insurance firms view as redundant statutory reserve requirements. An operating firm that reports under statutory accounting principles can cede insurance to a reinsurer that reports under GAAP, allowing for a reduction in overall reserves (Koijen and Yogo 2016).

Shadow insurance involves replacing high-quality capital buffers, required to satisfy future policy claims, with lower quality assets. To "create" shadow insurance, life insurers use a complicated series of non-arm's-length reinsurance arrangements and favorable state and foreign laws that maintain lower standards for reserve capital. We outline a basic shadow insurance arrangement in Appendix A. First, the parent company establishes a captive special purpose entity in a state (or country) with favorable laws on reserve capital. The parent company controls both the original insurer (which we refer to as the operating company in Appendix A) and the captive. The captive entity is unauthorized to sell insurance or annuity products to third parties and exists for the sole purpose of provide reinsurance of the operating company. Second, the operating company shifts life insurance policies to the unauthorized captive reinsurer along with the high-quality capital (such as cash or marketable securities) required to cover claims on those policies. Such transactions with captives are reviewed by regulators both in the insurance company's home state and the captive's home state, but since the captive reinsurer is not authorized to issue policies to third parties, the captive reinsurer is subject to lighter captive regulations.

For the insurance company to receive credit for reinsurance, the captive must have collateral that meets the regulatory requirements of the captive's home jurisdiction. There is likely to be a difference between the statutory reserve requirements and the insurance firm's estimate of the necessary economic reserves. This difference is referred to as the redundant reserves. In a typical shadow insurance transaction, the life insurer creates an account to hold assets backing the necessary economic reserves. The redundant reserves are then backed by a line of credit issued by a bank for the benefit of the parent and held by the captive. In some states, a guarantee from the life insurance (parent company) is sufficient to back the redundant reserves. The laws are favorable—and facilitate this practice—because they deem these lower quality assets can be used to meet capital reserve requirements. The end result of this substitution is that the high quality, freed-up capital may be used elsewhere in the business.

Many tax haven jurisdictions and certain states (e.g., South Carolina and Vermont) have enacted favorable laws to attract life insurance business that treat lower quality intercompany receivables and commercially worthless paper equivalent to higher quality assets, like cash and highly-liquid short-term investments. While shadow insurance represents an *economic* reduction in reserve capital, or at least in the quality of reserve capital, shadow insurance does not trigger a tax liability because there is no *legal* reduction in reserve capital from a federal tax perspective. In particular, the reduction in capital provides indefinite deferral of tax that would otherwise be owed because the federal government effectively delegates the definition of reserve capital to the jurisdiction of the insurer.[3] The result of this transaction is to reduce capital reserves for future life insurance and annuity claims, while indefinitely deferring federal tax that would otherwise be owed on such reserve reductions. In addition, shadow insurance arrangements using offshore subsidiaries in tax havens allow firms to generate permanent book tax differences that also reduce their effective tax rates and increase after-tax net income for financial reporting purposes.

Koijen and Yogo (2016) find liabilities ceded to shadow reinsurers grew from $11 billion in 2002 to $364 billion in 2012, consistent with much of the growth in shadow insurance coming after Regulations XXX and AXXX.[4] They note that changes in regulations for life insurance companies after 2000 required firms to hold more capital against their life insurance liabilities. States then responded in 2002 by allowing life insurers to establish insurance captives to avoid the new capital requirements. South Carolina led the way by allowing life insurers to establish captives with a primary function of assuming reinsurance from affiliated companies. As states attracting insurance business have benefited in terms of jobs and tax revenues (Cole and McCullough 2008), additional states have gradually adopted provisions to facilitate shadow insurance arrangement. Koijen and Yogo (2016) attempt to quantify the risk of shadow insurance and estimate that shadow insurance reduces risk-based capital by 53 percentage points. However, they note that shadow insurance benefits firms and consumers to the extent that it lowers the marginal cost of issuing policies. In fact, they estimate the average company using shadow insurance would raise prices

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[3] In the determination of taxable income, life insurers are permitted a deduction for increases in certain reserves (IRC Sec. 805(a)(2)) and must include in income any decreases in those reserves that occur during the year (IRC Sec. 803(a)(2)). In other words, a full accrual income measurement model is employed for tax purposes. Moreover, reserves include life insurance reserves, unearned premiums and unpaid losses included in total reserves, and discounted amounts necessary to satisfy obligations under insurance and annuity contracts (IRC Secs. 807(c), 816(b), and 816(c)).
[4] Using our own data from SNL Financial we find shadow insurance exceeds $350 billion by 2014.

from 10 to 21 percent and annual life insurance underwritten would fall by $6.8 billion (7 to 16 percent). Koijen and Yogo (2016) focus on how shadow insurance increases leverage and, in turn, risk. In contrast, we investigate whether shadow insurance is associated with measurable tax savings benefits, greater dividend payouts, and higher executive cash compensation.

3. Hypothesis Development

3.1 Shadow Insurance and Corporate Tax Avoidance

As the battle for insurance business has raged among states, firms have increasingly adopted shadow insurance structures that allow them to assert what they view to be the optimal level of reserves, using technicalities available from less stringent state statutes to override uniform reserve standards in substance, while ostensibly meeting them in appearance. States laws essentially allow firms to override standards promulgated by the insurance commissioners' association, which develops reserve requirements for all states. Consistent with this practice, a New York Department of Financial Services investigation report of shadow insurance use indicates that "shadow insurance makes a company's capital buffers—which serve as shock absorbers against unexpected losses or financial shocks—appear larger and rosier than they actually are" (NYDFS 2013). Thus, on its face, the aim of shadow insurance is to free up reserve capital and high quality assets while satisfying regulatory capital requirements.

In recent years, critics have painted a different picture of the incentives behind firms' use of shadow insurance. NYDFS superintendent Benjamin Lawsky argues that firms' use of shadow insurance appears to much more about tax avoidance than merely getting around onerous capital standards. He argues that firms want to appear to be following NAIC standards, which require them to establish oversized reserves that in turn generate federal tax savings (NYDFS 2013; Walsh 2014). Although the IRS has authority to investigate the tax treatment of the shadow insurance structures, some argue that the IRS "cannot often see the tax maneuver because such deals are extremely complex and the details are often protected by state confidentiality laws" (Walsh 2014). Still, whether shadow insurance provides incremental tax savings benefits above conventional tax planning techniques is not clear. A number of external monitors and regulators, including the IRS, external auditors, and actuaries review shadow insurance arrangements (Walsh 2014), which likely deters aggressive tax and capital management activities. Nevertheless, we posit that firms can exploit the facilitating provisions and regulatory approaches in shadow insurance states and foreign jurisdictions to generate significant tax savings. We formalize this prediction in the following hypothesis (stated in alternative form):

H1: Corporate tax avoidance is increasing in firms' shadow insurance usage.

Given the benefits of shadow insurance in easing reserve requirements and reducing taxes, it raises the question why all life insurance firms do not use shadow insurance. The likely reason is that shadow insurance is not without risk. Reinsurance default risk, or the risk that the captive will be unable to meet reinsurance obligations to the ceding parent firm is perhaps the most obvious risk. Indeed, although data limitations prevent researchers from directly measuring the risk effects of shadow insurance, Koijen and Yogo (2016) estimate the potential risk of shadow insurance under plausible assumptions. They find that adjusting risk-based capital by removing shadow insurance effects is associated with reduced ratings (by 3 notches) and a 3.5 factor increase in the probability of 10-year cumulative default.

By design these firms are only partially backing their reserves with high quality assets and, unlike an ordinary insurance firm, captives have little opportunity to diversify their risk because they can only reinsure policies of their affiliated insurers (Schwarcz 2015). Letters of credit (LOCs) also present a risk for shadow insurance transactions. LOCs often serve as collateral for the captive reinsurers obligation and as an asset on the captive reinsurers balance sheet allowing it to meet capital requirements. If the bank chooses not to renew a LOC then shadow insurance transactions may have to be unwound quickly. These risks, coupled with the regulatory and administrative costs of implementing shadow insurance, likely prevent some firms from engaging in shadow insurance. If firms are not in a tax clientele where they can fully utilize the benefits of shadow insurance, then the costs of shadow insurance may outweigh the benefits.

3.2 Shadow Insurance, Dividend Payout, and Executive Cash Compensation

Regardless of whether firms use shadow insurance to generate tax savings, critics suggest that shadow insurance may have meaningful effects on firm activities. Some argue that firms using shadow insurance can use the freed-up cash for compensation, shareholder payouts, and investment projects (Walsh 2014). For example, the NYDFS suggests that "shadow insurance allows companies to divert reserves for other purposes besides paying policyholder claims. Those other purposes may include anything from an acquisition of another company to executive compensation to paying dividends to investors." Despite these claims, prior research has not examined what firms do with the capital that they free up via shadow insurance. Given the intensity of critics' complaints about shadow insurance, we expect that the practice is likely associated with practices that introduce significant agency conflicts between policyholders, for whom the reserves are intended to protect, and other stakeholders who could benefit from the freed up cash. Two major stakeholders who could directly benefit from this freed up cash are shareholders, via dividend payouts, and managers, via cash (e.g., bonus) compensation. Consistent with these arguments, we propose the following hypotheses (stated in alternative form):

H2a: Dividend payouts are increasing in firms' shadow insurance usage.

H2b: Executive cash compensation is increasing in firms' shadow insurance usage.

4. Data and Research Design

4.1 SNL Financial and ExecuComp Sample Selection

We obtain life insurer regulatory filing data from S&P Global Market Intelligence's SNL Financial. SNL Financial collects and organizes data from regulatory filings that life insurers file with the NAIC. We obtain balance sheet, income statement, and reinsurance data for all life insurance companies that file with NAIC.[5] These data allow us to compile a sample of both privately-held and publicly-held life insurers. We use this sample for all of our analyses except our executive compensation tests. We conduct CEO compensation tests on the subset of publicly-held life insurers in the S&P 1500, for which ExecuComp data are available.

To measure shadow insurance, we require reinsurance data from regulatory filings, which are presented on Schedule S of the annual reporting to NAIC. These filings contain information about the cedent, the reinsurer, and the amount of the policy liability taken by the reinsurer from the cedent. Using SNL Financial, we are able to identify whether the reinsurer is authorized or unauthorized, where the reinsurer is domiciled (country and state), whether the reinsurer is affiliated or unaffiliated with the cedent, and how much in total reserves and policy-based liabilities are ceded to the reinsurer in the period.

To estimate shadow insurance amounts, we obtain Schedule S reinsurance data from SNL Financial beginning in 2004 and extending through 2013. The first available year of reinsurance data in SNL Financial restricts our study to begin in 2004. Our sample ends in 2013 because, for our tax avoidance tests, we measure the dependent variable over one contemporaneous and two leading periods. We conduct our tests at the parent company level, retaining all firm-years with non-missing data to construct our measures. As described in Table 1, our primary sample consists

[5] Consistent with Koijen and Yogo (2016), our sample consists of life insurance and annuity reinsurance arrangements.

of 3,168 firm-years, of which 371 firm-years (or 11.7 percent) exhibit evidence of shadow insurance. While a small percentage of our sample of life insurer firm-years, the economic magnitude of shadow insurance itself is substantial at $348 billion in the final sample year, as depicted in Figure 1.

To construct a sample of firm-years with data on CEO compensation, we merge the SNL Financial observations with ExecuComp observations on ticker and parent company name. To match on firm name, we use a spelling distance algorithm that estimates the distance between the two spellings and match only those observations that are sufficiently close. This matching procedure yields 181 firm-year observations, of which 147 firm-years exhibit evidence of shadow insurance.

4.2 Identifying Shadow Insurance

We follow the approach of Koijen and Yogo (2016) to identify and measure shadow insurance. For each reinsurer, we know its name, its state and country of domicile, whether it is affiliated with the ceding company, and whether it is authorized to sell life insurance and annuity products externally. We first isolate life insurance policy-based liabilities that are ceded (or, in effect, transferred) to affiliated and unauthorized reinsurers. We focus on affiliated reinsurers to eliminate third-party transactions, specifically focusing on "captives" or "captive reinsurers." However, our definition of shadow insurance is stricter than reinsurance to captives. We focus on unauthorized reinsurers, as these entities face lower reporting requirements than authorized reinsurers, yet still report the amount of reserves reinsured. Importantly, this type of reinsurer exists for the express purpose of providing reinsurance to the operating companies and is *not authorized* to provide insurance to third-party policyholders. Because life insurers claim that even captive reinsurance can serve the benefit of managing risk, we must go a step further than captive reinsurance in our definition of shadow insurance. To be shadow insurance, it is necessary that we identify reserve amounts ceded to affiliated *and* unauthorized reinsurers, where the reinsurer is unable to diversify external insurance policy risk with reinsured policy risk because they are not authorized to issue external polices.

The final step in our identification of shadow insurance is to consider the domicile of the reinsurer. If the reinsurer is located in a jurisdiction that supports shadow insurance (e.g., certain tax haven countries such as Bermuda, Barbados, and the Cayman Islands, or states with favorable reserve requirements, such as South Carolina, Vermont, and Iowa), then we classify policy-based liabilities ceded to these affiliated, unauthorized reinsurers as shadow insurance.[6] We take into account whether in each year the jurisdiction has regulations in place that support the use of low quality intercompany receivables to replace high quality cash, short-term investments, and similar liquid investments.[7] Measured at the parent company level, our shadow insurance variable captures the total amount of insurance and annuity reserve credit taken by captives that are unauthorized and in shadow insurance jurisdictions.[8] We further split shadow insurance into three categories: domestic (i.e., in U.S. states), tax havens, and dot havens (i.e., all tax havens except the Big Seven

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[6] Koijen and Yogo (2016) include a screen for whether or not the reinsurer is rated by A.M. Best. While we have these data, ours is a point-in-time file. When we include their screen on our final year of data, our estimates of shadow insurance are materially unaffected, suggesting that we have implemented reasonable screens to identify shadow insurance in a manner consistent with prior research.

[7] We construct our list of shadow insurance jurisdictions beginning with the jurisdictions of the unauthorized captive reinsurers in our data. From this, we examine each jurisdiction's regulations to assess whether the laws facilitate shadow insurance. For example, in Vermont and South Carolina, lightly regulated Special Purpose Financial Captive entities permit certain shadow insurance transactions. In Iowa, the statutory accounting rules for Limited Purpose Subsidiaries allow shadow insurance transactions, especially the one outlined in Appendix A. Unsurprisingly, we find that each foreign jurisdiction that facilitates shadow insurance is also a tax haven country based on the Dyreng and Lindsey (2009) classification. Also, we find that none of our foreign non-shadow jurisdictions are classified as tax havens by Dyreng and Lindsey (2009).

[8] Inferences are unchanged if we include ceded amounts for paid and unpaid losses recoverable. Losses recoverable represent amounts that can be obtained from the reinsurer (i.e., a receivable) to cover losses (whether paid or as-yet-unpaid) on the policies issued by the operating company and reinsured by the shadow insurer. In the case of amounts that the operating company expects to recover from affiliated, unauthorized reinsurers in favorable jurisdictions, these amounts will probably never actually be recovered (NYDFS 2013; Walsh 2014).

havens of Hong Kong, Ireland, Lebanon, Liberia, Panama, Singapore, and Switzerland (Hines and Rice 1994; Desai et al. 2006).[9]

4.3 Test of Determinants and Selection Model

Managers of life insurance firms can choose whether and to what extent to utilize shadow insurance. Accordingly, we follow Koijen and Yogo (2016) to model the determinants of the choice to use shadow insurance. By first modeling the determinants, we can estimate the inverse Mills ratio to control for potential selection bias in tests of the effects of shadow insurance on tax avoidance, payout policy, and compensation. Therefore, we begin by estimating the following first-stage probit regression:

$$D(Shadow)_{i,t+1} = \Phi(\alpha + \alpha_t + \beta_1\, Shadow\_IV_{i,t} + \beta_2\, Size_{i,t} + \beta_3\, Growth_{i,t} + \beta_4\, Lev_{i,t} + \beta_5\, Liquid_{i,t} + \beta_6\, PTROA_{i,t} + \beta_7\, Public_{i,t} + \beta_8\, Risk\_Cap_{i,t} + \beta_9\, Invest\_Approve_{i,t} + \beta_{10}\, GAAPETR3_{i,t-2\rightarrow t} + \beta_{11}\, Cash\_Ratio_{i,t} + \beta_{12}\, Div_{i,t}), \quad (1)$$

where $D(Shadow)_{i,t+1}$ is an indicator variable set to one if life insurer *i* has shadow insurance in year t + 1, and zero otherwise. $Shadow\_IV_{i,t}$ is our instrumental variable, defined as one if life insurer *i*'s operations at the end of year *t* are domiciled in a U.S. state that maintains favorable regulations that facilitate the use of shadow insurance, and zero otherwise. In defining this variable, we exclude Delaware from the set of shadow insurance states since Delaware provides opportunities for income tax planning that extend beyond shadow insurance (Dyreng et al. 2013).[10] $Size_{i,t}$ is the natural logarithm of the book value of total assets at the beginning of year *t*; $Growth_{i,t}$ represents the change in sales from year t - 1 to year *t*, scaled by average total assets (mean of beginning and ending assets); $Lev_{i,t}$ is total liabilities scaled by total assets, both measured at the

[9] In our sample, only four of the Big Seven have unauthorized captive reinsurers: Hong Kong, Ireland, Singapore, and Switzerland.

[10] Inferences are unaffected by the inclusion of Delaware in the set of shadow insurance jurisdictions for the purposes of measuring our instrumental variable.

beginning of year t; $Liquid_{i,t}$ is current assets (unencumbered cash plus unaffiliated investments) scaled by total liabilities, both measured at the beginning of year t; $PTROA_{i,t}$ represents pretax income in year t scaled by average total assets; $Risk\_Cap_{i,t}$ is capital coverage measured as total adjusted capital plus surplus scaled by required risk-based capital and expressed as a percentage; $GAAPETR3_{i,t-2\rightarrow t}$ represents the three-year average of firm's GAAP effective tax rate, measured as the sum of total tax expense over years t - 2 through t scaled by the sum of pretax income over years t - 2 through t. We add two variables, *Public* and *Invest_Approve*, to the Koijen and Yogo (2016) model to control for potential differences between public and private firms, both of which are in our primary sample. $Public_{i,t}$ is an indicator variable set to one if firm i is publicly traded in year t, and zero otherwise. $Invest\_Approve_{i,t}$ is an indicator variable set to one if firm i requires board approval for major investments in year t, and zero otherwise. We also include fiscal year fixed effects in Equation (1) and cluster standard errors by firm to mitigate cross-sectional and serial dependence, respectively, in the error term (Petersen 2009, Gow et al. 2010).

Equation (1) forms the basis for our selection model. To compute the inverse Mills ratio, we modify Equation (1) to include the control variables from the respective second-stage model (Lennox et al. 2012). For example, for the tax avoidance tests using lead GAAP ETRs as the dependent variable, we do not include $GAAPETR3_{i,t-2\rightarrow t}$ as a covariate in the first-stage selection model. Moreover, we restrict each of our subsequent tests of consequences of shadow insurance to those firm-years with shadow insurance (i.e., *D(Shadow)* = 1) (Lennox et al. 2012).

4.4 Tax Avoidance Tests

Our first hypothesis posits that corporate tax avoidance is increasing in a firm's use of shadow insurance. To test this hypothesis, we estimate the following OLS regressions:

$$GAAPETR3_{i,t \rightarrow t+2} = \alpha + \alpha_t + \beta_1 \{Dom\_Shadow_{i,t}, Haven\_Shadow_{i,t}, Dot\_Shadow_{i,t}\} + \beta_2 Size_{i,t} + \beta_3 Growth_{i,t} + \beta_4 Lev_{i,t} + \beta_5 Liquid_{i,t} + \beta_6 PTROA_{i,t} + \beta_7 Public_{i,t} + \beta_8 Risk\_Cap_{i,t} + \beta_9 Invest\_Approve_{i,t} + \beta_{10} Inv\_Mills_{i,t} + \varepsilon_{i,t \rightarrow t+2}, \quad (2)$$

where $GAAPETR3_{i,t \rightarrow t+2}$ represents the three-year GAAP effective tax rate measured over one contemporaneous and two leading years as the sum of the three years total tax expense scaled by the sum of the three years pretax income; $Dom\_Shadow_{i,t}$ is domestic shadow insurance for firm *i* in year *t*, scaled by beginning total assets; $Haven\_Shadow_{i,t}$ represents foreign haven shadow insurance for firm *i* in year *t*, scaled by beginning total assets; and $Dot\_Shadow_{i,t}$ is dot haven shadow insurance for firm *i* in year *t*, scaled by beginning total assets. Based on a review of captive insurance laws and regulations, we verify that foreign shadow insurance occurs only in foreign tax havens and that the foreign tax havens in our sample enable shadow insurance. *Dot_Shadow* is a subset of $Haven\_Shadow_{i,t}$ but is limited to non-Big 7 tax haven countries (Hines and Rice 1994). All other variable definitions are consistent with Equation (1). We again include fiscal year fixed effects and cluster standard errors at the firm level (Petersen 2009, Gow et al. 2010).

If shadow insurance is associated with increased tax avoidance, then we expect β_1 in Equation (2) to be negative. This finding would suggest that, *ceteris paribus*, shadow insurance in year *t* is negatively associated with three-year GAAP effective tax rates over years *t* through *t* + 2, and hence positively associated with tax avoidance over the three year period beginning in year *t*. GAAP ETRs are a widely-used measure of tax avoidance and are disclosed in firms' annual reports. GAAP ETR tests have the benefit of capturing book-tax differences treated as permanent differences (or tax expense booked at rates different from the top U.S. statutory tax rate of 35 percent). Moreover, GAAP ETRs are available for our entire sample.

To ensure that our tests are capturing reductions in total tax expense associated with the use of shadow insurance, we examine the placement of shadow insurance with respect to foreign tax havens and foreign dot havens by estimating the following regression:

$$\%Haven\_RE_{i,t}\ (\%Dot\_RE_{i,t}) = \alpha + \alpha_t + \beta_1 \{D(Shadow)_{i,t}, Tot\_Shadow_{i,t}\} + \beta_2 Size_{i,t} + \beta_3 Growth_{i,t} + \beta_4 Lev_{i,t} + \beta_5 Liquid_{i,t} + \beta_6 PTROA_{i,t} + \beta_7 Public_{i,t} + \beta_8 GAAPETR3_{i,t-2\rightarrow t} + \beta_9 Risk\_Cap_{i,t} + \beta_{10} Invest\_Approve_{i,t} + \beta_{11} Inv\_Mills_{i,t} + \varepsilon_{i,t} \quad (3)$$

where $\%Haven\_RE_{i,t}$ represents the ratio of reinsurance reserves of all forms—affiliated and unaffiliated, authorized and unauthorized—ceded to companies domiciled in foreign haven countries to total ceded reserves for firm *i* at the end of year *t*; $\%Dot\_RE_{i,t}$ similarly reflects the ratio of ceded reinsurance reserves to companies domiciled in dot haven countries to total ceded reserves for firm *i* at the end of year *t*; and $Tot\_Shadow_{i,t}$ represents total shadow insurance for firm *i* in year *t*, scaled by assets at the beginning of year *t*. All other variables are consistent with the definitions for Equations (1) and (2). Importantly, the dependent variables in equation (3) measure *all* reinsurance, at least some of which is either unaffiliated or authorized reinsurance and therefore not shadow insurance.

When we include the indicator (continuous) variable for shadow insurance, the coefficient of interest, β_1, reflects how having shadow insurance (how the amount of shadow insurance) relates to the proportion of reinsurance of in foreign tax havens. This validation test is designed to assess whether shadow insurance represents an economically important proportion of reinsurance in haven countries with low or zero statutory tax rates, which would enable GAAP effective tax rate reductions if foreign earnings were deemed permanently reinvested abroad (APB 28; ASC 740-10-25-3).

4.5 Dividend Policy Tests

We estimate the following regression to test the hypothesized relation between shadow insurance and dividend payouts to shareholders (H2a):

$$Div_{i,t+1} = \alpha + \alpha_t + \beta_1 Tot\_Shadow_{i,t} + \beta_2 Size_{i,t} + \beta_3 Growth_{i,t} + \beta_4 Lev_{i,t} + \beta_5 Liquid_{i,t} + \beta_6 PTROA_{i,t} + \beta_7 Public_{i,t} + \beta_8 GAAPETR3_{i,t-2\rightarrow t} + \beta_9 Risk\_Cap_{i,t} + \beta_{10} Invest\_Approve_{i,t} + \beta_{11} Cash\_Ratio_{i,t} + \beta_{12} Div_{i,t} + \beta_{13} Inv\_Mills_{i,t} + \varepsilon_{i,t+1}, \quad (4)$$

where $Div_{i,t+1(t)}$ represents dividends declared to common shareholders of firm i in year t + 1 (t), scaled by total assets at the beginning of the year t + 1 (t); and $Cash\_Ratio_{i,t}$ represents the balance of cash and short-term investments at the end of year t scaled by total assets at the beginning of year t. We include a lagged value of *Div* as a control variable to account for the high degree of autocorrelation in the level of dividend payouts. All other variables are as defined in the above equations. We include *Size*, *Growth*, *Lev*, *Liquid*, *PTROA*, and *Public* from Equation (1) as well as *Cash_Ratio*, and *Div* consistent with prior work suggesting that dividend policy is associated with firm size, growth opportunities, leverage, liquidity, profitability, excess cash, and prior dividends (DeAngelo et al. 2006; Dittmar 2000; Fama and French 2001; Grullon et al. 2011; Lie 2000, 2005; Michaely and Roberts 2012; Skinner 2008).[11] We also include additional controls for tax avoidance, risk capital buffers, and board investment approval, consistent with determinants of shadow insurance use in Equation (1), which are potentially associated with both shadow insurance and dividend policy. We include fiscal year fixed effects and cluster standard errors at the firm-level. As with our prior tests, we include the inverse Mills ratio drawn from a first-stage selection model (modified Equation (1)) and estimate Equation (4) only on the subset of firm-years that have shadow insurance, excluding from this test those firm-years that have no shadow

[11] We use the change in sales to proxy for growth opportunities since we do not have market data for other growth proxies, such as market-to-book, earnings-to-price, or cash flow-to-price.

insurance. If greater shadow insurance use yields increased dividend payouts, then we expect β_1 in Equation (4) to be positive. This finding would suggest that, *ceteris paribus*, greater amounts of shadow insurance in year *t* are associated with greater dividend payouts in year $t + 1$.

4.6 Compensation Tests

To test hypothesis H2b, on the relation between shadow insurance and CEO cash compensation, we estimate Equation (5):

$$\begin{aligned} LN\_CashComp_{i,t+1} = {} & \alpha + \alpha_t + \beta_1 Tot\_Shadow_{i,t} + \beta_2 LN\_Tenure_{i,t} + \beta_3 S\&P500_{i,t} + \beta_4 B/M_{i,t} \\ & + \beta_5 LN\_Sales_{i,t} + \beta_6 ROA_{i,t+1} + \beta_7 ROA_{i,t} + \beta_8 BHR_{i,t+1} + \beta_9 BHR_{i,t} + \beta_{10} Growth_{i,t} \\ & + \beta_{11} Lev_{i,t} + \beta_{12} Liquid_{i,t} + \beta_{13} GAAPETR3_{i,t-2 \rightarrow t} + \beta_{14} Risk\_Cap_{i,t} \\ & + \beta_{15} Invest\_Approve_{i,t} + \beta_{16} Inv\_Mills_{i,t} + \varepsilon_{i,t+1}, \end{aligned} \quad (5)$$

where $LN\_CashComp_{i,t+1}$ represents the natural logarithm of cash compensation in the form of salary and bonus for the CEO of firm *i* in year $t + 1$; $LN\_Tenure_{i,t}$ is the natural logarithm of firm *i*'s CEO tenure at the end of year *t*; $S\&P500_{i,t}$ is an indicator variable set to one if firm *i* is a member of the S&P 500 composite index at the end of fiscal year *t*, and zero otherwise; $B/M_{i,t}$ is the book-to-market ratio for firm *i* at the end of year *t*; $LN\_Sales_{i,t}$ is the natural logarithm of sales for firm *i* in year *t*; $ROA_{i,t+1(t)}$ represents return-on-assets for firm *i* in year $t + 1$ (*t*), measured as net income before extraordinary items for fiscal year $t + 1$ (*t*) scaled by average total assets at the ending and beginning of fiscal year $t + 1$ (*t*) ; and $BHR_{i,t+1(t)}$ represents buy-hold returns for firm *i* in year $t + 1$ (*t*), measured from the first month of fiscal year $t + 1$ (*t*) through the last month of fiscal year $t + 1$ (*t*). The variables are drawn from the normal compensation model of Core et al. (2008) and are designed to capture the expected level of compensation. All other variables are defined consistent with Equations (1) through (4). As in previous tests, we include the inverse Mills ratio estimated from a first-stage model similar to Equation (1), but including all of the above control variables. We also include year fixed-effects and cluster standard errors at the firm-level. If the coefficient on *Tot_Shadow* is greater than zero, this would be a finding consistent with greater shadow insurance, *ceteris paribus*, yielding greater future compensation payouts to CEOs.

As a falsification test, we examine whether there is an association between equity compensation and shadow insurance. Here, we examine whether managers at firms that engage in greater levels of shadow insurance are simply more highly paid. We expect that shadow insurance will free cash and other highly liquid capital for redistribution throughout the firm, and hence we predict a positive relation between shadow insurance and cash compensation (i.e., salary and bonuses). However, we would not expect a relation between shadow insurance and equity compensation *unless* other firm and managerial factors, such as firm size, firm complexity, or the CEO's latent talent, simultaneously affects shadow insurance and *overall* compensation. We re-estimate Equation (4) with $LN\_EqComp_{i,t+1}$ as the dependent variable. For this falsification test, we do not expect an association between total shadow insurance and equity compensation.

5. Empirical Results

5.1 Descriptive Statistics

In Table 2, Panels A and B, we present descriptive statistics for our measures constructed using SNL Financial data. In Panel A, we find that approximately 12 percent of firm-years have shadow insurance (371 of 3,168 firm-years). The mean of our instrumental variable—*Shadow_IV*—suggests that 36 percent (untabulated) of firm-years maintain at least one captive entity in a shadow insurance jurisdiction. Not surprisingly, the percentage of firm-years that *do* have shadow insurance is less than the percentage of firm-years that *could* have shadow insurance, highlighting that the life insurer presence in a jurisdiction that facilitates shadow insurance does not necessarily suggest that the firm uses shadow insurance. For the average firm in our sample, total shadow insurance equates to approximately 0.6 percent of lagged total assets—0.1 percent being domestic and 0.5 percent being foreign. These relatively small proportions are not surprising given that more than 88 percent of firm-years have zero shadow insurance.

We also find that the incidence and amount of shadow insurance increase over the sample period. In Figure 1, we measure the total shadow insurance based on the population of life insurers in SNL Financial. We document that aggregate shadow insurance increases from $151 billion in 2004 to $348 billion in 2013. This represents a 130 percent increase over this nine-year period. To provide further evidence of the impact that favorable state laws have on the use of shadow insurance, we examine how affiliated reinsurance changes in the state of Vermont around a 2007 law change that facilitated shadow insurance in the state. Comparing 2007 to 2008, we find that the amount of captive reinsurance insurance in the year after the change is nearly five times that in the prior year, growing from $3.2 billion to $15.1 billion. Moreover, the number of reinsurance arrangements with a captive reinsurer in Vermont increases from 2 to 25. Taken together, our evidence indicates that shadow insurance has increased over the sample period and represents an economically important way for life insurers to free-up reserve capital.

In Table 2, Panel B, we compare means and medians for firm-years that have shadow insurance (i.e., *D*(*Shadow*)=1) versus those that do not (i.e., *D*(*Shadow*)=0). For firm-years with shadow insurance, we find that total shadow insurance amounts to 5.4 percent of lagged total assets on average, with 0.8 percentage points attributable to domestic shadow insurance and 4.6 percentage points attributable to foreign shadow insurance. Notably, for firms using shadow insurance, the dollar amount of foreign, haven-based shadow insurance is more than five times that of domestic shadow insurance, which may be consistent with an underlying tax avoidance motivation. Further, we find that shadow insurance firm-years, on average, are larger in size, more leveraged, less liquid, and are more likely to be publicly traded. We also document that the average shadow insurance firm-year does not differ statistically from the average non-shadow insurance firm-year in terms of pre-tax return on assets, sales growth, and contemporaneous dividends declared. Moreover, we find that lagged three-year GAAP effective tax rates for firm-years with shadow insurance are, on average, 7.4 percentage points higher than those without shadow insurance. In Figure 3, we examine how one-year GAAP ETRs change around the initiation of shadow insurance. We identify 19 initiations of shadow insurance in our sample and find that, on average, GAAP ETRs drop by 5.5 percentage points in the year of initiation relative to the previous year. Collectively, these univariate findings are consistent with tax avoidance and tax rate management motives for engaging in shadow insurance. We also find that mean dividend payout is not statistically different across the two groups.

In Table 3, we present Pearson and Spearman pairwise correlation coefficients. We document a significant, positive Spearman correlation between shadow insurance (e.g., *D*(*Shadow*), *Tot_Shadow*, *Dom_Shadow*, *Haven_Shadow*, and *Dot_Shadow*) and dividend payout (*Div*) at the one-percent level. Similar to Table 2, we document positive, significant Spearman correlations between total and foreign shadow insurance and *lagged* three-year GAAP ETRs at the five-percent level. While counterintuitive, Figure 3 reveals how GAAP ETRs change around the initiation of shadow insurance, suggesting that firms with high past GAAP ETRs potentially engage in shadow insurance as a means of reducing their future ETRs. Overall, the evidence from Tables 2 and 3 provide some preliminary evidence in support of claims that shadow insurance facilitates increased tax avoidance and additional shareholder payouts.

5.2. Determinants Model

We present the results of estimating our determinants model in Table 4. A few key takeaways from this model are useful in interpreting our other results. Specifically, we find that our instrumental variable is positively and significantly (p < 0.01) associated with an indicator variable for one-year-ahead shadow insurance use. This relation supports our use of *Shadow_IV* as a measure of firm-years that could have used shadow insurance, regardless of whether they *do* use shadow insurance. We find that *Size*, *Public*, and *Invest_Approve* are each positively, significantly associated with the probability of future shadow insurance use. Of these findings, the most interesting is the positive relation between board approval for major investments and shadow insurance. Anecdotally, press articles suggest that managers view the reserve requirements under Regulations AXXX and XXX as being excessive and, hence, shadow insurance allows managers to free excess capital reserves and use them more productively in the core operations of the business. This finding suggests firms that are more likely to free capital through shadow insurance also potentially face stronger governance in the deployment of freed capital.

We also find that shadow insurance is negatively associated with sales growth, leverage, and liquidity. The negative association between shadow insurance and leverage points to a possible substitution between shadow insurance and debt. This may have to do with the availability of and thus the cost of debt relative to the cost of shadow insurance at the margin. This finding is not surprising in light of the relation between tax avoidance and financial constraints documented in prior studies (e.g., Edwards et al. 2016; Dyreng and Markle 2015). The results also suggest that shadow insurance is increasing in firms with slower sales growth and less liquid capital. This finding is consistent with regulators claims that shadow insurance allows life insurance firms to manage capital when opportunities for business expansion are limited (Koijen and Yogo 2016).

Before turning to our tax avoidance, dividend policy, and compensation tests, each of which use the Inverse Mills ratio constructed from a modified version of this model,[12] we examine the adequacy of this model as a control for potential selection bias. The model's goodness of fit, as measured using the area under the receiver operator characteristic (ROC) curve, appears quite high—0.898 for all firm-years and 0.836 for public firm-years. The area under the ROC curve is equivalent to the probability that the model will rank a randomly chosen true positive above a randomly chosen true negative. Hence, the area under the ROC provides a measure of the model's discriminatory power. The relatively high observed area suggests the model represents a reasonably well-discriminating first-stage model of the determinants of shadow insurance and appears appropriate to control for potential selection bias.

5.3 Tax Avoidance Tests

Table 5 presents the results of testing whether shadow insurance leads to increased tax avoidance (H1). Here, our aim is to explore whether shadow insurance appears to be a tool for life insurers to manage their tax bill. To provide the most generalizable evidence, we rely on data from SNL Financial and use GAAP effective tax rates to capture tax avoidance. For our sample, GAAP ETRs are useful because they are available for all firm-years in the SNL Financial sample. They also have the benefit of capturing tax avoidance through the use of permanent differences, which also affects GAAP net income.[13]

[12] The first-stage selection model for each test is modified to include the full vector of control variables from the second-stage regression specification (Lennox et al. 2012). These modified models exhibit similar or even improved goodness of fit relative to the tabulated model.

[13] In untabulated tests, we examine the relation between three-year cash ETRs and shadow insurance by restricting our sample to those firm-years in Compustat with available data to estimate the cash ETR. These tests yield results consistent with the tabulated GAAP ETR tests in that cash tax savings are increasing in total shadow insurance ($p < 0.01$). For this subsample, we conduct another robustness test in which we exclude total state income tax expense from our calculation of GAAP ETRs. This modified GAAP ETR is positively associated with total shadow insurance ($p < 0.01$). This test ensures that the relation between shadow insurance and tax avoidance is not confined to state income tax expense reductions.

We estimate Equation (2), which regresses the three-year GAAP ETRs, measured over one contemporaneous and two leading years, on measures of domestic, foreign tax haven, and foreign dot haven shadow insurance and other control variables. We are interested in how this relation varies contingent on the location of the shadow insurance (domestic versus foreign tax haven). We also are interested in whether this relation differs for public firm-years, given that these firm-years are arguably subject to greater capital market pressure than privately-held firm-years. We find a negative and statistically significant association between domestic shadow insurance and GAAP ETRs throughout. Specifically, in column (1) we present the test of the relation between domestic shadow insurance and three-year GAAP ETRs for the full SNL Financial sample. The coefficient on *Dom_Shadow* is -3.860 ($p < 0.01$). For a one standard deviation increase in *Dom_Shadow*, all else constant, three-year GAAP ETRs decrease by 2.32 percent. Multiplying through by average pre-tax income for the SNL Financial sample with shadow insurance, this represents approximately a decrease of tax expense, and hence an increase in net income, of $42.3 million.[14] For the public only sample, in column (6), we document a negative, statistically significant relation between *Dom_Shadow* and *GAAPETR3* ($p < 0.01$). The coefficient of -4.446 indicates that for a one standard deviation in *Dom_Shadow*, *GAAPETR3* decreases by 2.67 percentage points. For the public-only shadow insurance sample, this results in an increase in net income on average of $85.3 million. Columns (4) and (5) ((9) and (10)), controlling for *Haven_Shadow* and *Dot_Shadow* respectively, suggest that the result is not the outcome of *Dom_Shadow* being correlated with *Haven_Shadow* or *Dot_Shadow*. Overall, the evidence suggests that domestic shadow insurance is statistically and economically associated with greater tax avoidance.

[14] Pre-tax income for the full (public) firm-years with shadow insurance is $182.59 million ($319.86 million).

We also find evidence consistent with a significant positive association between foreign tax haven shadow insurance and tax avoidance. Here, the coefficient magnitudes appear smaller relative to *Dom_Shadow*, yet the economic effects are similar. For example, in column (2), for the full SNL Financial sample, the coefficient on *Haven_Shadow* is -0.699 ($p < 0.05$). Economically, this suggests a reduction in GAAP ETRs of -1.56 percentage points for a one standard deviation increase in *Haven_Shadow*, which implies an increase in net income of $39.6 million from reduced tax expense. In column (7), for the public only sample, we document a coefficient on *Haven_Shadow* of -1.201 ($p < 0.01$). For a one standard deviation increase in *Haven_Shadow*, *GAAPETR3* is lower by -3.72 percentage points, which equates to a reduction in tax expense and an increase in net income of $119.1 million. The combined results suggest that public firms appear to exhibit a much stronger association between foreign shadow insurance and GAAP effective tax rates. This finding is consistent with capital market pressures providing additional incentives for firms to use shadow insurance as a tool to reduce total tax expense and to increase net income.

We document a similar capital market pressure-based effect when we examine dot haven shadow insurance across the two samples (full versus public only). Specifically, we find that the coefficient on *Dot_Shadow* is indistinguishable from zero for the full sample. However, when we restrict attention to public firm-years, we find that *Dot_Shadow* is negatively and significantly associated with *GAAPETR3* ($p < 0.05$). Overall, these results are consistent with shadow insurance being positively associated with shadow insurance. Moreover, the results suggest that the association is economically meaningful for the subset of firms engaged in shadow insurance.

To provide further evidence that our tests reflect the decision to place shadow insurance reserves offshore, where firms can take advantage of the option to designate foreign earnings as permanently reinvested and hence recognize permanent benefits, we estimate Equation (3) which allows us to examine broadly the location of reinsurance. In these tests, we regress the ratio of all foreign tax haven (foreign dot haven) reinsurance reserves to all reinsurance reserves on shadow insurance and control variables. By "all reinsurance," we mean both affiliated and unaffiliated reinsurance and reinsurance with both authorized and unauthorized companies. From these tests, presented in Table 6, we find that firm-years with shadow insurance have on average 55.4 percent more reinsurance activity ($p < 0.01$) through foreign tax havens and 43.0 percent more reinsurance activity ($p < 0.01$) through dot havens than firms without shadow insurance. Using a continuous measure of shadow insurance, we document consistent results. Additionally, we find similar results restricting our attention to public firm-years only. This suggests that, on average, activity in foreign tax havens and foreign dot havens is much greater for firm-years with shadow insurance than for firm-years without, which is consistent with the use of tax havens to reduce cash tax burdens and, when combined with the option to permanently reinvest foreign earnings, to reduce total tax expense for external financial reporting purposes.

5.4 Dividend Policy Tests

In Table 7, we present the results of estimating our dividend policy tests. These tests again rely on the all firm-years with shadow insurance and publicly-held firm-years with shadow insurance, respectively. In the first column, we estimate Equation (4) using all shadow insurance firm-years. In this model, we hold constant the prior period's dividend payout level, which allows us interpret the coefficient on *Tot_Shadow* as the relation between total shadow insurance and changes in future dividend payouts. We find a positive and statistically significant relation between *Tot_Shadow* and future dividends, Div_{t+1}. The estimated slope coefficient on *Tot_Shadow* of 0.085 ($p < 0.01$) indicates that for a one standard deviation increase in shadow insurance, the dividend payout in subsequent periods increases by 0.5 percent of total assets. Relative to the sample mean for shadow insurance firm-years, this result represents approximately a 29.8 percent increase in dividend payout. In column (2), we again find a significant positive association between *Tot_Shadow* and future dividend payout at the one-percent level. The coefficient magnitude for publicly-held firm-years is nearly twice that of the full shadow insurance sample. This finding is consistent with capital market pressures producing greater distribution of freed capital from shadow insurance to shareholders. Collectively, the results presented in Table 7 are consistent with greater shadow insurance use being associated with relatively greater dividend payout.

5.5 Compensation Tests

In Table 8, we present the results of estimating our compensation tests. For these tests, we use observations at the intersection of ExecuComp and SNL Financial. This dramatically reduces the sample size due to the requirements that firm-years are (i) publicly-held and (ii) in the S&P 1500. In Panel A of Table 8, we present descriptive statistics for the 181 firm-years at the intersection of our SNL Financial and ExecuComp. A much higher percentage of this subsample of firm-years exhibit evidence of shadow insurance (81.2 percent) relative to the full SNL sample (11.7 percent). Similarly, for firm-years in our compensation tests, total shadow insurance represents a higher percentage of lagged total assets (3.0 percent versus 0.6 percent).

In Panel B of Table 8, columns (1) and (3), we present the results of estimating Equation (5) with $LN\_CashComp_{i,t+1}$, the natural logarithm of cash compensation for the CEO at firm i in year $t + 1$, as the dependent variable. Column (1) presents the results using the model from Core et al. (2008) for normal compensation and use the entire 181 firm-years from the merged SNL-ExecuComp sample. We find that *Tot_Shadow* is positively significantly associated with future CEO cash compensation at the one-percent level. In column (3), we add variables from SNL Financial to the Core et al. (2008) model. We also include the inverse Mills ratio to account for potential selection bias, which restricts our tests to the 147 firm-years with shadow insurance. Here, we again document a positive and statistically significant association between *Tot_Shadow* and future CEO cash compensation ($p < 0.01$).

Because firms that use shadow insurance tend to be larger than firms that do not use shadow insurance, a concern is that CEOs at firms that use shadow insurance are simply better compensated than CEOs at firms that do not use shadow insurance. If this were the case, we would expect to find other forms of compensation, such as equity-based compensation, also to be higher for CEOs at firms with shadow insurance. To test against this possibility, and to provide a falsification test, we examine whether an association obtains between *Tot_Shadow* and future CEO *equity* compensation. Because shadow insurance frees cash, we do not expect *Tot_Shadow* to be related to CEO *equity* compensation unless shadow insurance surrogates for such factors as firm size and complexity or latent CEO talent, which likely result in higher CEO pay overall.

In column (2), we use the Core et al. (2008) model and examine the entire SNL-ExecuComp sample of 181 firm-years, and fail to reject the null hypothesis of no relation between the amount of shadow insurance and CEO equity compensation. In column (4), we restrict attention to those firm-years that use shadow insurance, add the SNL Financial control variables, and include the inverse Mills ratio. Here, we again fail to reject the null of no relation between total shadow insurance and CEO equity compensation. In combination, the results of these tests suggest that our CEO cash compensation results do not simply reflect shadow insurance firms paying their CEOs more compensation generally, but rather that firms using shadow insurance subsequently pay their CEOs more *cash*.

In untabulated robustness tests, we verify our compensation results are not driven by the Troubled Asset Relief Program (TARP). The Department of Treasury places restrictions on the forms and amount of executive compensation for firms that received TARP. We exclude observations in our sample where firms received federal assistance (e.g., AIG, Hartford Financial Services, and Lincoln National) and re-estimate our regressions. We again find that total shadow insurance is positively and significantly associated with future cash compensation ($p < 0.01$), and we fail to reject the null of no relation between total shadow insurance and future equity compensation. This provides us comfort that the results are not being driven by a small subset of firms that have restrictions on the how and how much they compensation their executives.

6. Conclusion

Recent reports highlight life insurance firms' use of shadow insurance, a complex series of accounting arrangements, to free up liquid assets typically held as reserves to pay policy claims. Using data from SNL Financial, we find aggregate shadow insurance at the end of our sample period of $348 billion. Shadow insurance is attractive to life insurance firms for two reasons. First, it allows firms to circumvent restrictive capital requirements. Second, the use of shadow insurance may facilitate corporate tax avoidance. Despite critics' claims that shadow insurance allows firms to engage in corporate tax avoidance and use freed up capital to pay shareholders and executives, the firm-level consequences of using shadow insurance are not well understood.

We investigate shadow insurance firms' behavior from three angles: corporate tax behavior, payout policy, and executive cash compensation. We find that shadow insurance arrangements are concentrated in tax haven subsidiaries and are associated with significant tax savings: for the average public firm in our sample, a one standard deviation increase in tax haven (domestic) shadow insurance usage is associated with an effective tax rate reduction of 3.72 (2.67) percentage points, representing over $119 ($85) million in tax savings. We also find that shadow insurance use is associated with significantly greater cash payouts to shareholders and executives.

While the tax avoidance literature provides evidence on various determinants of corporate tax avoidance, we still have a limited understanding of how firms minimize their tax burdens. We study a specific mechanism, shadow insurance, which life insurance firms exploit to generate economically significant tax savings.

Although our study focuses on firms in a single industry, the magnitude and import of the practice make it a setting of economic interest. As the debate over the shadow insurance practice continues, a recent New York Department of Financial Service report warns that "shadow insurance also could potentially put the stability of the broader financial system at greater risk" (NYDFS 2013, 1). Estimates suggest that shadow banking in the banking sector exceeded $500 billion at its height before the financial crisis (Adrian and Aschraft 2012). Although we do not study the net social benefits or costs that shadow insurance provides, our results suggest that tax avoidance is likely an important determinant of shadow insurance usage and that the practice may in turn lead to significant agency conflicts between shareholders, managers, and policyholders.

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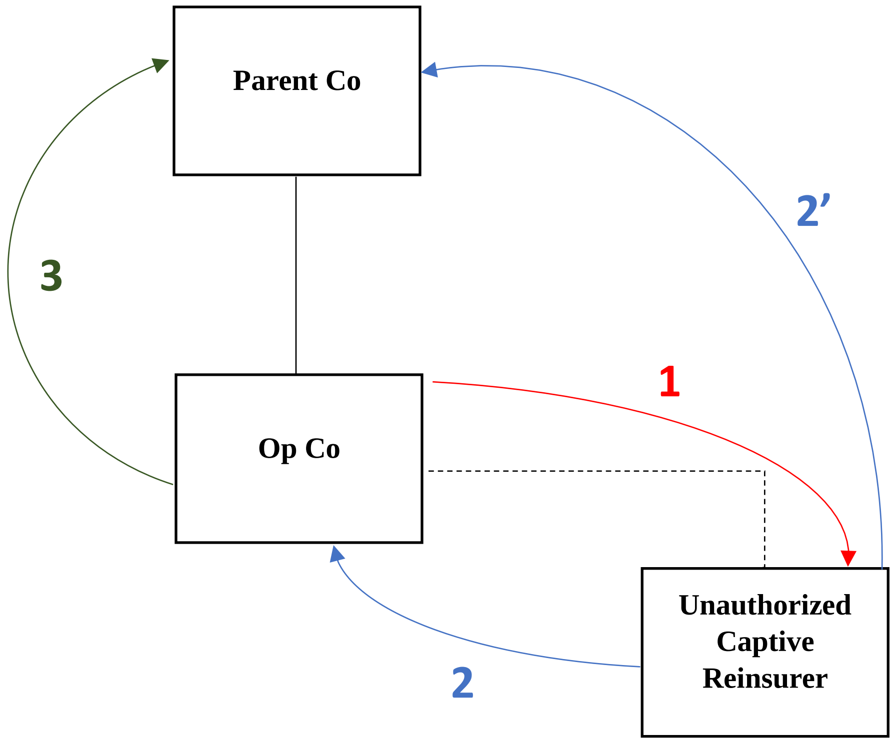
Appendix A. A Simplified Shadow Insurance Transaction



The diagram above and steps outlined below document, in a simplified manner, one type of shadow insurance transaction. This transaction is referred to as a “naked parental guarantee.”

0. To facilitate shadow insurance, the insurance group (i.e., parent and its subsidiaries) establishes a captive reinsurer in a state or a foreign jurisdiction that supports shadow insurance. This captive is not authorized to transact with third parties, and is therefore “unauthorized.”

1. Unauthorized Captive Reinsurer assumes policy-based liabilities and related reserve-based capital from Op Co (i.e., the operating company). Here, the reserves represent highly liquid assets, such as cash, cash equivalents, and other short-term investements. These highly liquid assets are considered to be “high quality.” When the transfer occurs, the Op Co adjusts its reserve and risk-based capital requirements downward due to the policies being reinsured by another entity.

2. High quality assets are replaced by an intercompany receivable, receivable by the Captive from Op Co. The assets are transferred from the Captive *back* to Op Co.

2’. (Simultaneous with Step #2) Captive secures a guarantee on Op Co’s intercompany debt to the Captive. This allows the Captive Reinsurer’s intercompany receivable to qualify as suitable reserve capital in the Captive’s jurisdiction (e.g., Iowa) and allows the Captive to satisfy its reserve requirements.

3. High quality assets, presently held by Op Co, are no longer required to be kept on reserve because the policy-related liabilities have been transferred to the Captive and the Captive now possess the required capital under its jurisdiction’s laws. Hence, the Op Co can transfer the high quality assets to Parent Co for unrestricted use (e.g., investments, compensation, or shareholder payouts).

Appendix B. Variable Definitions

This appendix describes the measurement for each variable in our analyses. We obtain the data to construct our variables from several sources—SNL Financial, ExecuComp, Compustat, and CRSP. We indicate below from which data source we draw the inputs to each variable.

<u>SNL Financial Variables:</u>

TOT_SHADOW	=	Total shadow insurance, following Koijen and Yogo (2016) defined as the amounts from annual regulatory filings, Schedule S – Part 4 ("Reinsurance Ceded to Unauthorized Companies") reported in column (5), "Reserve Credit Taken," plus modified coinsurance. These amounts are consolidated based on the parent company key from SNL Financial and scaled by the total assets at the beginning of the year for the parent company. We identify shadow insurance as unauthorized and affiliated reinsurance where the reinsurer is in a jurisdiction that supports shadow insurance. We construct a list of shadow insurance jurisdictions by starting with the jurisdictions of the unauthorized captive reinsurers in our data. From this, we examine each jurisdictions regulations to see if the laws facilitate shadow insurance.
DOM_SHADOW	=	Domestic shadow insurance scaled by total assets at the beginning of the year. Domestic shadow insurance represents the portion of affiliated unauthorized reinsurance in U.S. states with laws that enable shadow insurance.
HAVEN_SHADOW	=	Foreign haven shadow insurance scaled by total assets at the beginning of the year. Foreign haven shadow insurance represents the portion of affiliated unauthorized reinsurance in foreign countries with laws that enable shadow insurance. Our set of foreign countries that support shadow insurance have also been identified as foreign tax havens (Dyreng and Lindsey 2009).
DOT_SHADOW	=	Dot haven shadow insurance scaled total assets at the beginning of the year. Dot havens are defined as foreign haven, excluding the Big Seven countries (i.e., Hong Kong, Ireland, Lebanon, Liberia, Panama, Singapore, and Switzerland). By definition, this variable is a subset of HAVEN_SHADOW.
D(SHADOW)	=	Indicator variable equal to 1 if SHADOW > 0; zero otherwise.
SHADOW_IV	=	Instrumental variable for shadow insurance: an indicator variable equal to 1 if the parent company has at least one subsidiary domiciled in a U.S. state that provides favorable regulations to facilitate shadow insurance (e.g., Vermont, South Carolina, Iowa, Utah, Hawaii, Nebraska, Missouri, and Arizona) in the years such favorable regulation is in place; zero otherwise. We exclude Delaware from consideration, even though it is a shadow insurance jurisdiction, because evidence suggests use of Delaware to avoid tax domestically (Dyreng, Lindsey, and Thornock 2013).

GAAPETR3	=	Three-year GAAP effective tax rate, defined as the sum of total tax expense for the current and two *leading* years, divided by the sum of pretax income over the same period. In tests when GAAPETR3 is a control variable, the measurement period is set to one contemporaneous and two *lagged* annual periods for total tax expense and for pretax income.
%HAVEN_RE	=	Percentage of total insurance reserves ceded to affiliates, whether authorized or unauthorized, and located in foreign haven-based countries. This variable captures both shadow insurance contracts (unauthorized, affiliated) and non-shadow insurance contracts (authorized, affiliated).
%DOT_RE	=	Percentage of total insurance reserves ceded to affiliates, whether authorized or unauthorized, and located in dot haven-based countries. This variable captures both shadow insurance contracts (unauthorized, affiliated) and non-shadow insurance contracts (authorized, affiliated).
DIV	=	Dividends declared in the following year scaled by beginning total assets. In dividend policy tests, dividends declared in the following year serve as the independent variable while we control for the current year dividends declared as dividend declarations tend to be persistent year-over-year.
SIZE	=	Log of total assets at the beginning of the year.
GROWTH	=	Growth in sales from the previous year to the current year, scaled by average total assets.
LEV	=	Leverage, defined as total liabilities scaled by total assets, both measured at the beginning of the year.
LIQUID	=	Cash plus unaffiliated investments scaled by current liabilities, both measured at the beginning of the year.
PTROA	=	Pre-tax return on assets, defined as pre-tax income scaled by total assets at the beginning of the year.
RISK_CAP	=	Risk-based capital coverage ratio, estimated following Koijen and Yogo (2016), which is the ratio of adjusted capital and surplus to required capital.
PUBLIC	=	Indicator variable equal to one if the firm-year is public (i.e., has a match in Compustat using ticker symbol and firm-name spelling distance algorithm), and zero otherwise.
CASH_RATIO	=	Measure of cash available for distribution, defined as cash and cash equivalents scaled by total assets, at the beginning of the year.

ExecuComp Variables:

LN_CASHCOMP	=	CEO annual cash-based compensation (salary plus bonus).
LN_EQCOMP	=	CEO annual equity-based compensation (non-cash components).
LN_TENURE	=	Natural logarithm of one plus the CEO's tenure at the beginning of the year.

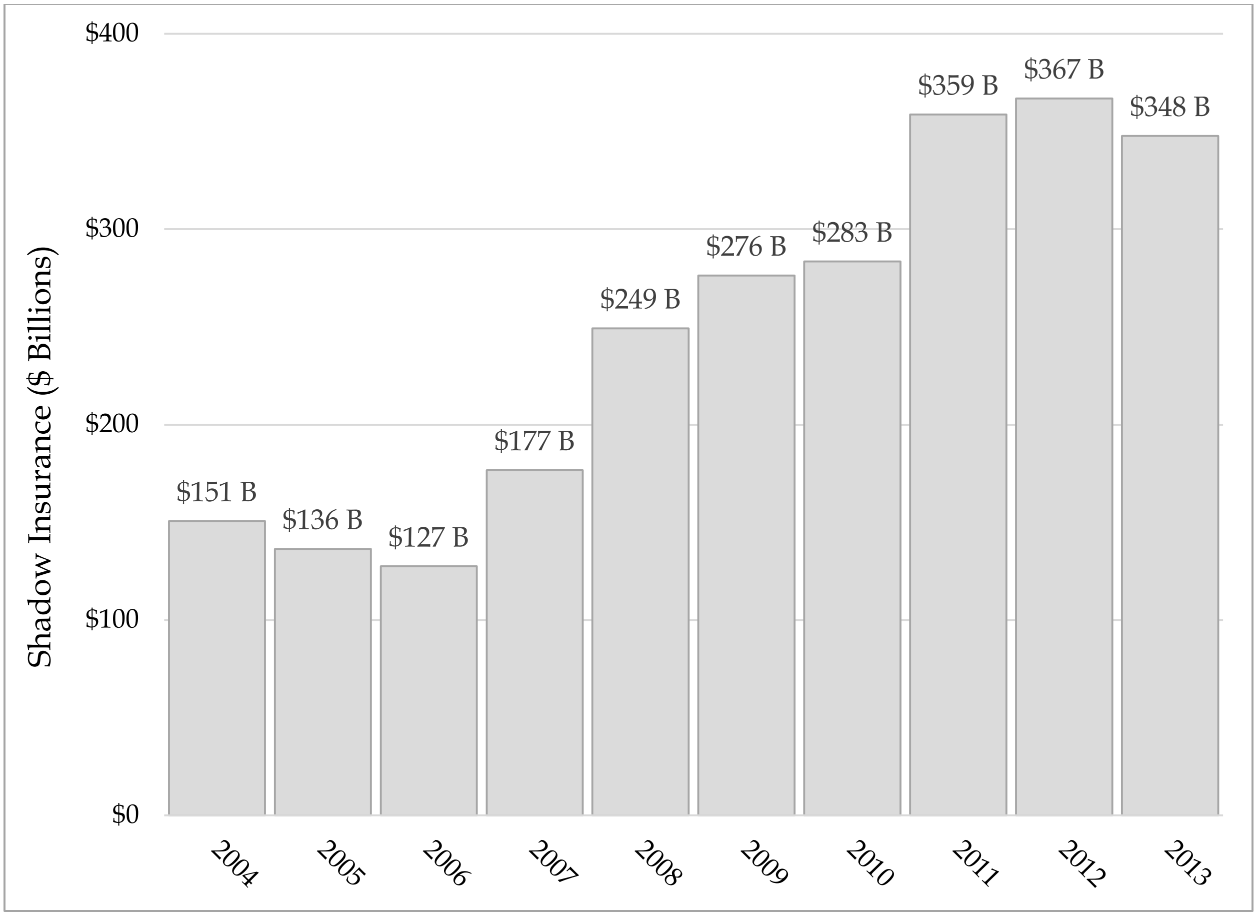
Compustat Variables:

LN_SALES	=	Natural logarithm of annual sales (Compustat: SALE).
B/M	=	Book-to-market ratio, measured as book value of equity (Compustat: CEQ) divided by market value of equity (Compustat: CSHO*PRCC_F) at the beginning of the year.
ROA	=	Return-on-assets, measured as net income before extraordinary items (Compustat: IB) divided by average total assets (Compustat: AT).

CRSP Variables:

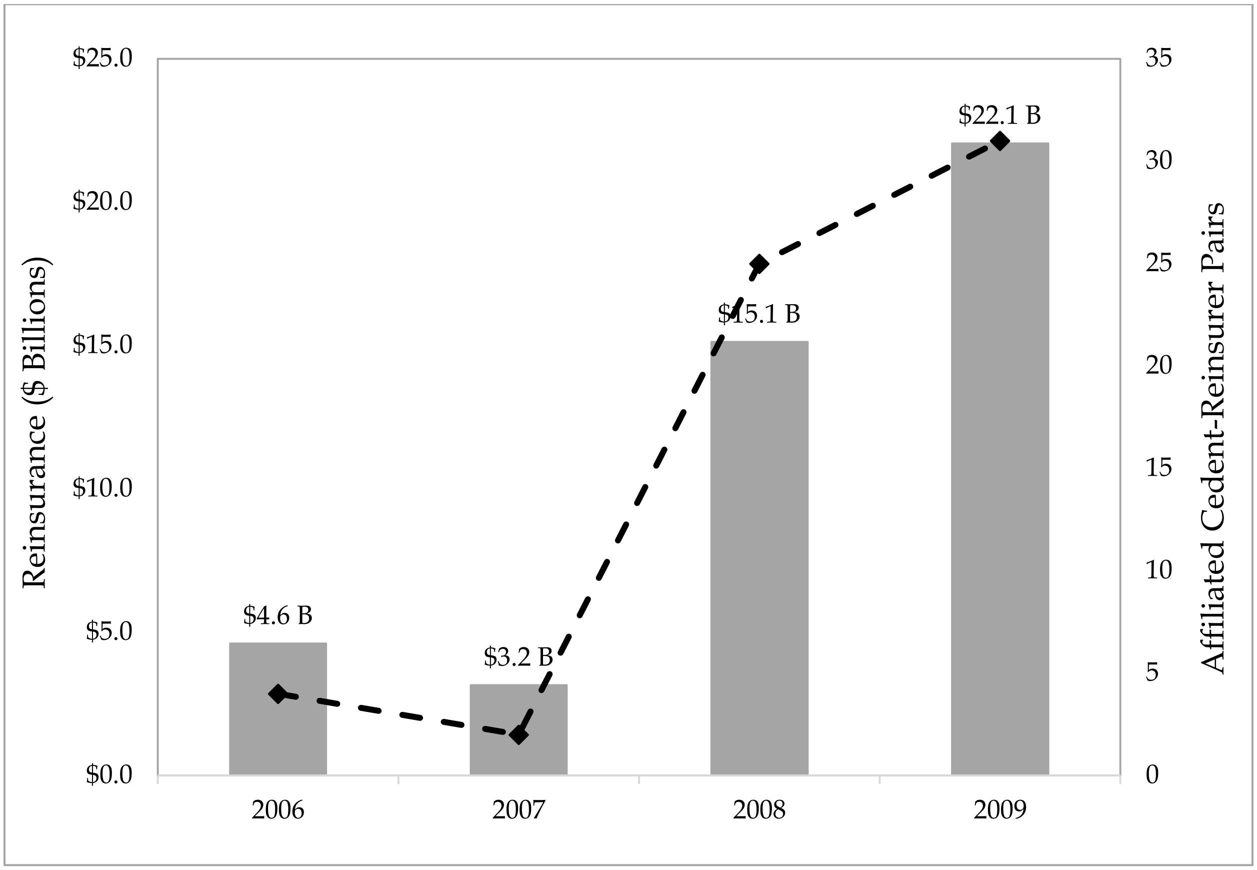
S&P500	=	Indicator variable that takes a value of 1 if the firm is a component of the S&P 500 index at the beginning of the year, and zero otherwise.
BHR	=	Annual buy-hold returns, measured with monthly returns from the first month through the last month of the relevant fiscal year.

Figure 1. Aggregate Shadow Insurance over Time



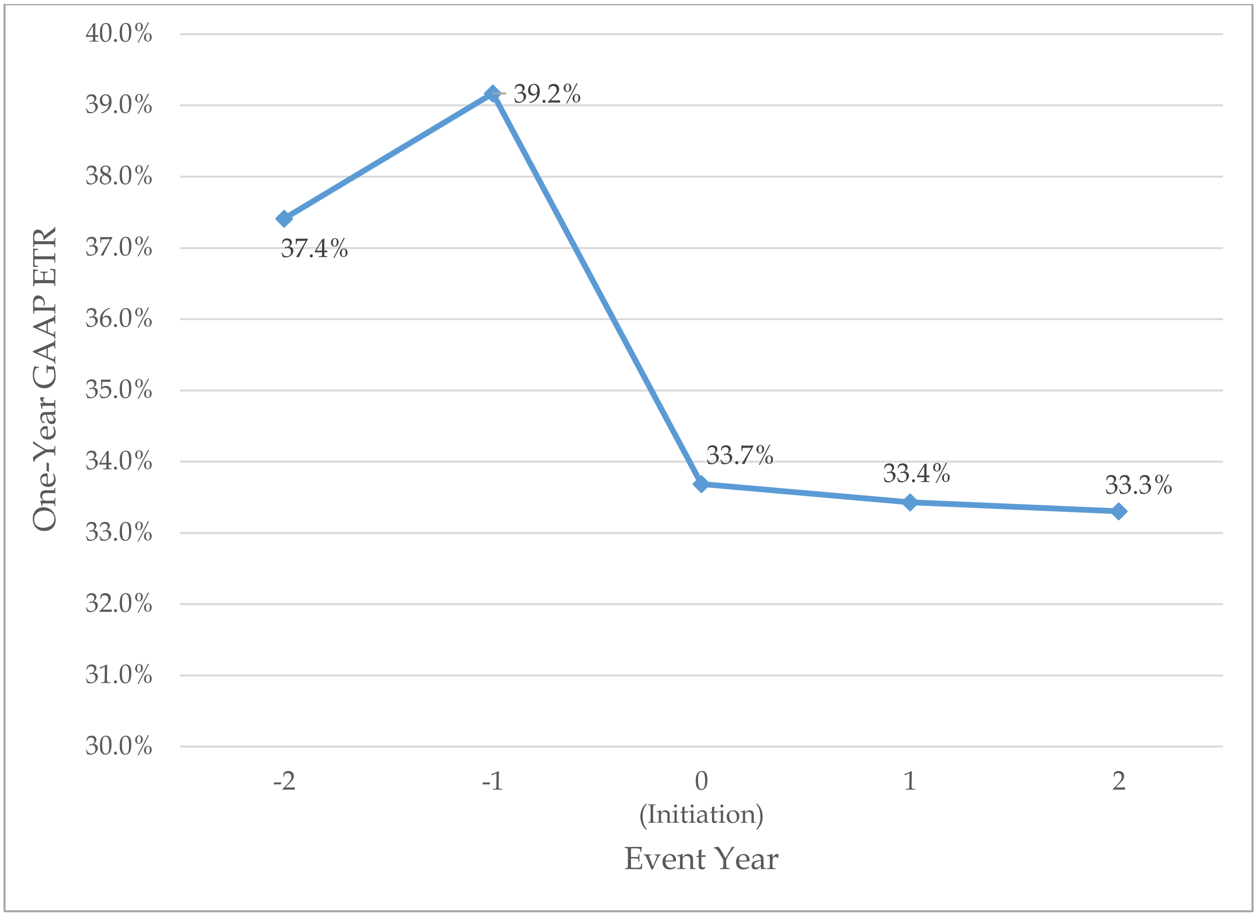
This figure presents the aggregate dollar value of shadow insurance during our sample period. The horizontal axis is fiscal year while the vertical axis is shadow insurance in billions of U.S. dollars.

Figure 2. Affiliated Reinsurance in Vermont around the 2007 Law Change



This figure presents the shift in affiliated reinsurance in Vermont around a 2007 law change that introduced Special Purpose Financial Captives, an entity for captive reinsurance with low capital reserve requirements. This change facilitated the use of Vermont captive entities for shadow insurance purposes. Before 2007, firms could not use Vermont captives to engage in shadow insurance. In this figure, we include all reinsurance ceded to an affiliated, or captive, entity in Vermont, including amounts that are characterized as shadow insurance and those not characterized as shadow insurance. We observe an increase in both the dollar value of reinsurance as well as the number of cedent-reinsurer pairs after the law change. This increase is predominantly attributable to shadow insurance in Vermont.

Figure 3. Changes in GAAP Effective Tax Rates around Shadow Insurance Initiation



In this figure, we plot the change in one-year GAAP effective tax rates around the initiation of a shadow insurance arrangement. We identify 19 instances where an insurance group (i.e., parent company and all its affiliates) initiates shadow insurance. We assign the shadow insurance initiation (or first year of shadow insurance) as year 0, and we compute the averages of annual GAAP ETRs for each of years -2 through +2.

Table 1. Sample Selection

SNL Financial sample:	
Life insurer firm-years in SNL Financial with available data on reinsurance from 2004 through 2013:	3,338
Missing data for control variables:	(170)
Final SNL Financial sample:	3,168
Firm-years in SNL Financial with Shadow Insurance:	371
ExecuComp sample:	
Life insurer firm-years in final SNL Financial sample with a match (based on ticker and firm name) in ExecuComp:	181
Firm-years in ExecuComp sample with Shadow Insurance:	147

Table 2. Descriptive Statistics

Panel A. All Firm-Years, SNL Sample

Variable	N	Mean	Std. Dev.	P25	Median	P75
D(SHADOW)	3,168	0.117	0.322	0.000	0.000	0.000
TOT_SHADOW	3,168	0.006	0.033	0.000	0.000	0.000
DOM_SHADOW	3,168	0.001	0.006	0.000	0.000	0.000
HAVEN_SHADOW	3,168	0.005	0.031	0.000	0.000	0.000
DOT_SHADOW	3,168	0.003	0.014	0.000	0.000	0.000
SIZE	3,168	12.371	3.094	9.902	11.962	14.504
GROWTH	3,168	0.011	0.160	-0.014	0.003	0.028
LEV	3,168	0.681	0.283	0.494	0.806	0.905
LIQUID	3,168	6.794	34.43	0.993	1.121	1.801
PTROA	3,168	0.009	0.044	0.002	0.006	0.020
GAAPETR3	3,168	0.341	0.379	0.000	0.183	0.652
RISK_CAP	3,168	85.454	261.10	12.755	18.610	34.340
PUBLIC	3,168	0.213	0.409	0.000	0.000	0.000
INVEST_APPROVE	3,168	0.850	0.357	1.000	1.000	1.000
DIV	3,168	0.018	0.067	0.000	0.000	0.006
CASH_RATIO	3,168	0.137	0.215	0.018	0.048	0.141

This panel presents the mean, standard deviation, 25^{th} percentile (p25), median, and 75^{th} percentile (p75) for the variables drawn from the SNL Financial data. All variables are as defined in Appendix B.

Table 2—continued

Panel B. All Firm-Years by Shadow Insurance

	D(SHADOW) = 1			D(SHADOW) = 0				
Variable	N	Mean	Median	N	Mean	Median	Mean Diff	Median Diff
TOT_SHADOW	371	0.054	0.014	2,797	0.000	0.000	0.054 ***	0.014 ***
DOM_SHADOW	371	0.008	0.000	2,797	0.000	0.000	0.008 ***	0.000 ***
HAVEN_SHADOW	371	0.046	0.002	2,797	0.000	0.000	0.046 ***	0.002 ***
DOT_SHADOW	371	0.022	0.001	2,797	0.000	0.000	0.022 ***	0.001 ***
SIZE	371	16.19	16.55	2,797	11.87	11.45	4.32 ***	5.10 ***
GROWTH	371	0.002	0.004	2,797	0.013	0.003	-0.011	0.000
LEV	371	0.845	0.906	2,797	0.659	0.782	0.186 ***	0.124 ***
LIQUID	371	0.924	0.861	2,797	7.573	1.153	-6.649 ***	-0.292 ***
PTROA	371	0.008	0.005	2,797	0.010	0.007	-0.001	-0.002 **
GAAPETR3	371	0.406	0.295	2,797	0.333	0.172	0.074 ***	0.123 ***
RISK_CAP	371	23.81	15.30	2,797	93.63	19.64	-69.82 ***	-4.34 ***
PUBLIC	371	0.604	1.000	2,797	0.161	0.000	0.443 ***	1.000 ***
INVEST_APPROVE	371	0.887	1.000	2,797	0.845	1.000	0.042 **	0.000 **
DIV	371	0.018	0.002	2,797	0.018	0.000	0.000	0.002 ***
CASH_RATIO	371	0.048	0.022	2,797	0.149	0.055	-0.101 ***	-0.033 ***

This panel presents by D(SHADOW) the mean and median for the variables drawn from the SNL Financial data. All variables are as defined in Appendix B. We report the differences in means and medians. To test for significance, we conduct a *t*-test of the differences in means and a Kruskal-Wallis test for differences in medians. ***,**, and * represent statistical significance at the 1%, 5%, and 10% levels, respectively.

Table 3. Correlation Matrix

	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)	(9)	(10)	(11)	(12)	(13)	(14)	(15)	(16)
(1) D(SHADOW)	1	***0.534***	***0.476***	***0.478***	***0.506***	***0.449***	-0.022	***0.212***	***-0.062***	-0.010	***0.062***	***-0.086***	***0.348***	**0.037**	0.001	***-0.151***
(2) TOT_SHADOW	***0.956***	1	***0.410***	***0.986***	***0.804***	***0.207***	**-0.035**	***0.136***	-0.034	-0.028	-0.023	***-0.053***	***0.202***	0.019	-0.002	***-0.079***
(3) DOM_SHADOW	***0.681***	***0.704***	1	***0.250***	***0.237***	***0.255***	-0.018	***0.124***	-0.030	-0.022	-0.011	**-0.045**	***0.238***	0.026	-0.014	***-0.082***
(4) HAVEN_SHADOW	***0.773***	***0.823***	***0.313***	1	***0.809***	***0.173***	-0.033	***0.121***	-0.030	-0.025	-0.022	***-0.047***	***0.170***	0.016	0.001	***-0.069***
(5) DOT_SHADOW	***0.744***	***0.789***	***0.283***	***0.959***	1	***0.211***	-0.028	***0.126***	-0.032	-0.014	0.008	***-0.050***	***0.237***	0.029	0.000	***-0.074***
(6) SIZE	***0.412***	***0.401***	***0.302***	***0.321***	***0.305***	1	-0.004	***0.656***	***-0.225***	***-0.068***	***0.203***	***-0.301***	***0.367***	***0.069***	***-0.112***	***-0.498***
(7) GROWTH	-0.021	-0.030	-0.026	-0.034	-0.030	**0.044**	1	-0.031	-0.015	***0.089***	0.026	**-0.041**	-0.019	-0.015	0.011	***0.064***
(8) LEV	***0.247***	***0.246***	***0.193***	***0.196***	***0.185***	***0.694***	0.000	1	***-0.387***	***-0.192***	-0.017	***-0.506***	***0.062***	0.023	***-0.159***	***-0.503***
(9) LIQUID	***-0.314***	***-0.309***	***-0.228***	***-0.252***	***-0.241***	***-0.739***	-0.028	***-0.900***	1	0.003	0.029	***0.629***	**0.041**	-0.017	***0.048***	***0.283***
(10) PTROA	-0.029	**-0.037**	**-0.036**	-0.015	-0.015	***-0.165***	0.006	***-0.353***	***0.304***	1	***0.098***	-0.005	***0.052***	-0.032	***0.198***	**0.040**
(11) GAAPETR3	***0.063***	**0.050**	0.018	**0.048**	***0.058***	***0.202***	**0.045**	***-0.058***	**0.041**	***0.187***	1	0.024	***0.126***	0.034	***0.053***	***-0.106***
(12) RISK_CAP	***-0.137***	***-0.139***	***-0.063***	***-0.133***	***-0.117***	***-0.358***	***-0.084***	***-0.563***	***0.559***	***0.219***	***0.119***	1	***0.061***	-0.028	0.031	***0.377***
(13) PUBLIC	***0.348***	***0.333***	***0.247***	***0.286***	***0.274***	***0.345***	-0.032	***0.090***	***-0.155***	***0.058***	***0.121***	***-0.059***	1	0.030	***0.125***	***-0.065***
(14) INVEST_APPROVE	**0.037**	**0.034**	**0.036**	0.019	0.025	***0.072***	-0.013	0.023	-0.029	***-0.059***	0.028	-0.011	0.030	1	-0.027	-0.003
(15) DIV	***0.165***	***0.147***	***0.099***	***0.165***	***0.160***	***0.220***	-0.007	**0.042**	***-0.097***	***0.267***	***0.188***	**0.041**	***0.238***	0.024	1	**0.040**
(16) CASH_RATIO	***-0.194***	***-0.187***	***-0.155***	***-0.141***	***-0.130***	***-0.635***	**0.039**	***-0.571***	***0.565***	***0.150***	***-0.103***	***0.211***	***-0.152***	0.010	***-0.149***	1

This table presents the Pearson product-moment (Spearman rank) pairwise correlation coefficients above (below) the diagonal. All variables are defined in Appendix B. ***Bold-italics*** and **bold** represent statistical significance at the 1%- and 5%-levels, respectively.

Table 4. Test of Determinants and Selection Model

$$D(Shadow)_{i,t+1} = \Phi(\alpha + \alpha_t + \beta_1 Shadow\_IV_{i,t} + \beta_2 Size_{i,t} + \beta_3 Growth_{i,t} + \beta_4 Lev_{i,t} + \beta_5 Liquid_{i,t} + \beta_6 PTROA_{i,t} + \beta_7 Public_{i,t} + \beta_8 Risk\_Cap_{i,t} + \beta_9 Invest\_Approve_{i,t} + \beta_{10} GAAPETR3_{i,t-2 \rightarrow t} + \beta_{11} Cash\_Ratio_{i,t} + \beta_{12} Div_{i,t})$$

	Full SNL Sample	Public SNL Sample
	(1)	(2)
	D(SHADOW)	D(SHADOW)
SHADOW_IV	0.400***	0.508***
	(0.000)	(0.000)
SIZE	0.277***	0.308***
	(0.000)	(0.000)
GROWTH	-0.480*	-1.072**
	(0.073)	(0.013)
LEV	-1.599***	-2.592***
	(0.000)	(0.000)
LIQUID	-0.256***	-0.300*
	(0.004)	(0.066)
PTROA	0.419	-0.0760
	(0.706)	(0.969)
PUBLIC	0.539***	
	(0.000)	
RISK_CAP	0.0153	-0.0514
	(0.815)	(0.507)
INVEST_APPROVE	3.661***	3.982***
	(0.000)	(0.000)
GAAPETR3	-0.0449	-0.274*
	(0.650)	(0.081)
CASH_RATIO	0.477*	-0.315
	(0.055)	(0.668)
DIV	0.674	0.656
	(0.209)	(0.349)
Year FE	Y	Y
Firm Clustered SE	Y	Y
Observations	3,168	674
Pseudo R-squared	0.357	0.279
Area under ROC Curve	0.898	0.836

This table presents the results of estimating the first-stage selection model to control for potential selection bias in the decision to use shadow insurance. In this table, our instrumental variable represents life insurers from SNL financial with captive entities in U.S. states that have favorable regulation that facilitates the use of shadow insurance. The dependent variable represents an indicator variable for firm-years with non-negative shadow insurance reserves ceded. All variables are as defined in Appendix B. We present coefficients and, in parentheses, *p*-values for standard errors clustered at the firm-level. ***, **, and * represent statistical significance at the 1%, 5%, and 10% levels, respectively.

Table 5. Tax Avoidance Tests

$$GAAPETR3_{i,t\rightarrow t+2} = \alpha + \alpha_t + \beta_1 \{Dom\_Shadow_{i,t}, Haven\_Shadow_{i,t}, Dot\_Shadow_{i,t}\} + \beta_2 Size_{i,t} + \beta_3 Growth_{i,t} + \beta_4 Lev_{i,t} + \beta_5 Liquid_{i,t} + \beta_6 PTROA_{i,t} + \beta_7 Public_{i,t} + \beta_8 Risk\_Cap_{i,t} + \beta_9 Invest\_Approve_{i,t} + \beta_{10} Inv\_Mills_{i,t} + \varepsilon_{i,t\rightarrow t+2}$$

	Full SNL Sample					Public SNL Sample				
	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)	(9)	(10)
	GAAPETR3	GAAPETR3	GAAPETR3	GAAPETR3	GAAPETR3	GAAPETR3	GAAPETR3	GAAPETR3	GAAPETR3	GAAPETR3
DOM_SHADOW	**-3.860*****			**-3.805*****	**-3.994*****	**-4.446*****			**-4.077*****	**-4.583*****
	(-2.829)			**(-2.808)**	**(-2.918)**	**(-2.795)**			**(-2.615)**	**(-2.909)**
HAVEN_SHADOW		**-0.699****		**-0.786*****			**-1.201*****		**-1.335*****	
		(-2.531)		**(-2.909)**			**(-3.412)**		**(-4.260)**	
DOT_SHADOW			**-0.538**		**-0.680**			**-1.451****		**-1.525****
			(-0.918)		**(-1.169)**			**(-2.145)**		**(-2.292)**
SIZE	0.048	0.051	0.053	0.043	0.043	-0.030	-0.029	-0.029	-0.029	-0.029
	(1.411)	(1.503)	(1.543)	(1.267)	(1.269)	(-0.625)	(-0.600)	(-0.592)	(-0.617)	(-0.610)
GROWTH	0.514***	0.465***	0.502***	0.470***	0.505***	0.455	0.377	0.394	0.373	0.380
	(2.947)	(2.645)	(2.847)	(2.701)	(2.892)	(1.610)	(1.341)	(1.374)	(1.344)	(1.350)
LEV	-0.527	-0.511	-0.592*	-0.392	-0.448	-0.076	-0.095	-0.151	0.028	-0.002
	(-1.526)	(-1.472)	(-1.685)	(-1.130)	(-1.276)	(-0.164)	(-0.207)	(-0.326)	(0.063)	(-0.005)
LIQUID	-0.003	-0.021	-0.018	-0.005	-0.000	-0.014	-0.046	-0.039	-0.028	-0.021
	(-0.058)	(-0.407)	(-0.339)	(-0.096)	(-0.008)	(-0.223)	(-0.742)	(-0.628)	(-0.464)	(-0.340)
PTROA	1.040	1.032	1.178	0.884	1.016	1.198	1.337	1.254	1.230	1.132
	(1.291)	(1.277)	(1.452)	(1.103)	(1.262)	(1.245)	(1.403)	(1.293)	(1.307)	(1.187)
PUBLIC	0.156***	0.159***	0.146***	0.182***	0.174***					
	(3.521)	(3.544)	(3.139)	(4.032)	(3.711)					
RISK_CAP	0.000	0.000	0.000	0.000	0.000	0.002	0.002	0.002	0.002	0.002
	(0.336)	(0.310)	(0.365)	(0.261)	(0.307)	(1.145)	(1.286)	(1.183)	(1.270)	(1.173)
INVEST_APPROVE	-0.006	-0.011	-0.015	0.004	0.003	0.072	0.055	0.051	0.087	0.089
	(-0.080)	(-0.143)	(-0.197)	(0.056)	(0.034)	(0.712)	(0.556)	(0.506)	(0.888)	(0.896)
INV_MILLS	1.048**	1.386***	1.219**	1.233**	1.067**	-0.529	-0.068	-0.281	-0.137	-0.323
	(2.024)	(2.659)	(2.342)	(2.374)	(2.060)	(-0.726)	(-0.092)	(-0.379)	(-0.190)	(-0.445)
Year FE	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y
Firm Clustered SE	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y
Observations	371	371	371	371	371	224	224	224	224	224
Adjusted R-squared	0.105	0.101	0.087	0.118	0.106	0.057	0.073	0.043	0.099	0.076

Table 5—continued

Economic Significance:										
DOM_SHADOW	-2.32%			-2.28%	-2.40%	-2.67%			-2.45%	-2.75%
	(-$42.3 m)			(-$41.7 m)	(-$43.8 m)	(-$85.3 m)			(-$78.2 m)	(-$88.0 m)
HAVEN_SHADOW		-2.17%		-2.44%			-3.72%		-4.14%	
		(-$39.6 m)		(-$44.5 m)			(-$119.1 m)		(-$132.4 m)	
DOT_SHADOW			n.a.		n.a.			-2.03%		-2.14%
								(-$65.0 m)		(-$68.3 m)

This table presents the results of estimating various specifications related to tax avoidance. We focus on effective tax rate reductions and use the GAAP effective tax rate as our proxy for tax avoidance. This variable as the added feature of being available for all firm-years in the SNL financial sample. The variables of interest are three different measures of shadow insurance—*Dom_Shadow*, *Haven_Shadow*, and *Dot_Shadow*—as defined in Appendix B. All firm-years in these tests have positive shadow insurance amounts, such that the Inverse Mills ratio (*Inv_Mills*) can be determined to control for selection bias. *Inv_Mills* is drawn from a first-stage specification similar to that in Table 4, except that all control variables in second-stage tax avoidance test are present in the first-stage selection model. All variables are as defined in Appendix B. We present coefficients and, in parentheses, *t*-statistics for standard errors clustered at the firm-level. ***, **, and * represent statistical significance at the 1%, 5%, and 10% levels, respectively. Below the coefficients, we tabulate the economic significance of these results—the change in GAAP ETRs due to a one standard deviation increase in the respective shadow insurance variable. Directly below the ETR effects, we present in parentheses the dollar effect on net income, determined by multiplying the ETR effect by average pretax income for the respective sample (full or public only).

Table 6. Placement of Shadow Insurance

$$\%Haven\_RE_{i,t}\ (\%Dot\_RE_{i,t}) = \alpha + \alpha_t + \beta_1 \{D(Shadow)_{i,t}, Tot\_Shadow_{i,t}\} + \beta_2 Size_{i,t} + \beta_3 Growth_{i,t} + \beta_4 Lev_{i,t} + \beta_5 Liquid_{i,t} + \beta_6 PTROA_{i,t} + \beta_7 Public_{i,t} + \beta_8 GAAPETR3_{i,t-2\rightarrow t} + \beta_9 Risk\_Cap_{i,t} + \beta_{10} Invest\_Approve_{i,t} + \beta_{11} Inv\_Mills_{i,t} + \varepsilon_{i,t}$$

	Full SNL Sample				Public SNL Sample			
	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)
	%HAVEN_RE	%DOT_RE	%HAVEN_RE	%DOT_RE	%HAVEN_RE	%DOT_RE	%HAVEN_RE	%DOT_RE
D(SHADOW)	**0.554*** **	**0.430*** **			**0.577*** **	**0.473*** **		
	(9.246)	**(7.875)**			**(7.127)**	**(6.206)**		
TOT_SHADOW			**1.902*** **	**1.851*** **			**1.783*** **	**1.710*** **
			(4.602)	**(4.553)**			**(3.317)**	**(3.218)**
SIZE	-0.005	-0.002	-0.002	-0.003	-0.008	-0.000	-0.052	-0.054
	(-1.350)	(-0.656)	(-0.028)	(-0.039)	(-0.580)	(-0.024)	(-0.503)	(-0.526)
GRWOTH	-0.014	-0.004	-0.060	-0.056	-0.048	-0.037	-0.209	-0.201
	(-0.992)	(-0.248)	(-0.311)	(-0.291)	(-0.766)	(-0.541)	(-1.106)	(-1.055)
LEV	0.033*	0.007	0.757	0.775	-0.034	-0.079	-0.072	-0.069
	(1.655)	(0.433)	(0.893)	(0.919)	(-0.332)	(-0.807)	(-0.076)	(-0.074)
LIQUID	-0.000	-0.000	0.082	0.085	0.000	0.000	0.171	0.178
	(-0.169)	(-0.935)	(0.779)	(0.825)	(0.393)	(0.552)	(1.393)	(1.497)
PTROA	0.059	0.083	2.647***	2.679***	0.481	0.400	1.553	1.572
	(1.065)	(1.563)	(2.871)	(2.922)	(1.601)	(1.442)	(1.284)	(1.316)
PUBLIC	0.012	0.018	0.149	0.154				
	(0.487)	(0.846)	(0.868)	(0.896)				
GAAPETR3	0.009	0.018	0.070	0.063	-0.009	0.034	0.077	0.066
	(0.560)	(1.180)	(0.743)	(0.662)	(-0.201)	(0.740)	(0.653)	(0.543)
RISK_CAP	0.000	-0.000	0.000	0.000	-0.000	-0.000	-0.005***	-0.005***
	(0.201)	(-0.022)	(1.504)	(1.463)	(-1.421)	(-1.355)	(-3.104)	(-3.326)
INVEST_APPROVE	0.004	-0.003	-0.100	-0.124	-0.022	0.000	-0.130	-0.169*
	(0.768)	(-0.672)	(-1.358)	(-1.620)	(-1.159)	(0.013)	(-1.663)	(-2.005)
INV_MILLS			0.968	0.958			-0.347	-0.393
			(0.692)	(0.686)			(-0.191)	(-0.216)
Year FE	Y	Y	Y	Y	Y	Y	Y	Y
Firm Clustered SE	Y	Y	Y	Y	Y	Y	Y	Y
Observations	3,168	3,168	371	371	674	674	224	224
Adjusted R-squared	0.536	0.458	0.209	0.208	0.470	0.413	0.266	0.269

Table 6—continued

This table presents the results of estimating the location of shadow insurance reserves. In columns (1) and (2), we include all firm-years in our SNL sample and use an indicator variable for the presence of shadow insurance. In columns (3) and (4), we add the Inverse Mills ratio. Hence, in these columns, all firm-years have positive shadow insurance amounts, such that the Inverse Mills ratio (*Inv_Mills*) can be determined to control for selection bias. *Inv_Mills* is drawn from a first-stage specification similar to that in Table 4, except that all control variables in second-stage tax avoidance test are present in the first-stage selection model plus an exclusion restriction. Columns (5) through (8) repeat columns (1) through (4) but for the subsample of public firm-years. All variables are as defined in Appendix B. We present coefficients and, in parentheses, t-statistics for standard errors clustered at the firm-level. ***, **, and * represent statistical significance at the 1%, 5%, and 10% levels, respectively.

Table 7. Dividend Policy

$$Div_{i,t+1} = \alpha + \alpha_t + \beta_1 Tot\_Shadow_{i,t} + \beta_2 Size_{i,t} + \beta_3 Growth_{i,t} + \beta_4 Lev_{i,t} + \beta_5 Liquid_{i,t} + \beta_6 PTROA_{i,t} + \beta_7 Public_{i,t} + \beta_8 GAAPETR3_{i,t-2\rightarrow t} + \beta_9 Risk\_Cap_{i,t} + \beta_{10} Invest\_Approve_{i,t} + \beta_{11} Cash\_Ratio_{i,t} + \beta_{12} Div_{i,t} + \beta_{13} Inv\_Mills_{i,t} + \varepsilon_{i,t+1}$$

	Full SNL Sample	Public SNL Sample
	(1)	(2)
	DIV(+1)	DIV(+1)
TOT_SHADOW	**0.085*** **	**0.134*** **
	(2.612)	**(2.664)**
SIZE	0.007	0.011
	(1.552)	(1.221)
GROWTH	-0.031	-0.085**
	(-1.490)	(-2.096)
LEV	-0.125***	-0.289***
	(-4.000)	(-3.676)
LIQUID	-0.002**	0.000
	(-2.123)	(0.119)
PTROA	0.091	0.009
	(0.862)	(0.058)
PUBLIC	0.015*	
	(1.899)	
GAAPETR3	0.009	0.024**
	(1.446)	(2.061)
RISK_CAP	-0.000	-0.001***
	(-0.584)	(-2.966)
INVEST_APPROVE	-0.005	-0.014
	(-0.486)	(-0.879)
CASH_RATIO	0.025	0.130*
	(0.673)	(1.831)
DIV(0)	0.216***	0.124*
	(4.619)	(1.816)
INV_MILLS	0.073	0.065
	(1.049)	(0.483)
Year FE	Y	Y
Firm Clustered SE	Y	Y
Observations	371	224
Adjusted R-squared	0.217	0.291

Table 7—continued

This table presents the results of estimating specifications related to dividend policy. We use the leading level of dividends to assets as our measure of payout, including the lagged level of dividends to assets to control for dividend policy. The variable of interest is SHADOW, which captures changes in the amount of ceded shadow insurance reserves for a firm-year. All firm-years in the tests have positive shadow insurance amounts, such that the Inverse Mills ratio (*Inv_Mills*) can be determined to control for selection bias. *Inv_Mills* is drawn from the relevant first-stage specification in Table 4. Column (1) reports test results for both private and public firm-years. Column (2) reports public only. All variables are as defined in Appendix B. We present coefficients and, in parentheses, *t*-statistics for standard errors clustered at the firm level. ***, **, and * represent statistical significance at the 1%, 5%, and 10% levels, respectively.

Table 8. Compensation

Panel A. Compensation Tests—Descriptive Statistics

Variable	N	Mean	Std. Dev.	P25	Median	P75
LN_CASHCOMP	181	6.927	1.794	6.857	6.968	7.435
LN_EQCOMP	181	8.393	1.536	8.097	8.973	9.393
D(SHADOW)	181	0.812	0.392	1.000	1.000	1.000
TOT_SHADOW	181	0.030	0.057	0.005	0.033	0.099
LN_TENURE	181	1.999	0.933	1.305	1.887	2.558
S&P500	181	0.790	0.408	1.000	1.000	1.000
B/M	181	0.811	1.155	0.618	0.787	1.112
LN_SALES	181	9.805	1.045	9.059	9.622	10.572
ROA(t+1)	181	0.016	0.020	0.006	0.014	0.029
ROA(t)	181	0.016	0.020	0.006	0.014	0.029
BHR(t+1)	181	0.089	0.495	-0.095	0.096	0.234
BHR(t)	181	0.091	0.496	-0.083	0.090	0.234
GROWTH	181	0.017	0.105	-0.014	0.002	0.023
LEV	181	0.795	0.235	0.787	0.883	0.940
LIQUID	181	3.282	12.091	0.627	0.835	1.055
GAAPETR3	181	0.489	0.369	0.169	0.394	0.865
RISK_CAP	181	43.37	142.02	12.08	14.88	17.91
INVEST_APPROVE	181	0.884	0.321	1.000	1.000	1.000

This panel presents the mean, standard deviation, 25th percentile (p25), median, and 75th percentile (p75) for the variables in the compensation model, which includes inputs from ExecuComp, Compustat, and CRSP. All variables are as defined in Appendix B.

Table 8—continued

Panel B. Compensation Tests—Regression Analyses

$$LN\_CashComp_{i,t+1}\ (LN\_EqComp_{i,t+1}) = \alpha + \alpha_t + \beta_1 Tot\_Shadow_{i,t} + \beta_2 LN\_Tenure_{i,t} + \beta_3 S\&P500_{i,t} + \beta_4 B/M_{i,t} + \beta_5 LN\_Sales_{i,t} + \beta_6 ROA_{i,t+1} + \beta_7 ROA_{i,t} + \beta_8 BHR_{i,t+1} + \beta_9 BHR_{i,t} + \beta_{10} Growth_{i,t} + \beta_{11} Lev_{i,t} + \beta_{12} Liquid_{i,t} + \beta_{13} GAAPETR3_{i,t-2\rightarrow t} + \beta_{14} Risk\_Cap_{i,t} + \beta_{15} Invest\_Approve_{i,t} + \beta_{16} Inv\_Mills_{i,t} + \varepsilon_{i,t+1}$$

	Core et al. (2008) Model		Full Model with IM	
	(1)	(2)	(3)	(4)
	LN_CASHCOMP	LN_EQCOMP	LN_CASHCOMP	LN_EQCOMP
TOT_SHADOW	**7.719*** **	**3.108**	**8.143*** **	**2.846**
	(3.671)	**(0.881)**	**(3.479)**	**(0.858)**
LN_TENURE	-0.405***	-0.597***	-0.160	-0.512***
	(-3.329)	(-5.402)	(-0.994)	(-3.842)
S&P500	-0.401	0.425	-0.596	0.660*
	(-1.128)	(1.317)	(-1.274)	(1.708)
B/M	-0.874***	-0.329***	-0.764***	-0.248**
	(-6.754)	(-2.802)	(-5.425)	(-2.132)
LN_SALES	-0.243*	-0.133	0.017	0.081
	(-1.951)	(-1.178)	(0.108)	(0.633)
ROA(t+1)	-15.236	-7.588	-2.596	-5.528
	(-1.631)	(-0.895)	(-0.243)	(-0.627)
ROA(t)	18.054**	9.023	31.714***	11.068
	(2.209)	(1.217)	(3.422)	(1.446)
BHR(t+1)	0.221	-0.108	0.562*	0.006
	(0.770)	(-0.415)	(1.748)	(0.022)
BHR(t)	0.375	0.423*	0.616	0.757**
	(1.345)	(1.673)	(1.429)	(2.123)
GROWTH			0.446	0.511
			(0.235)	(0.327)
LEV			3.278**	2.295*
			(2.086)	(1.768)
LIQUID			-0.119	0.250
			(-0.455)	(1.163)
GAAPETR3			0.611	0.126
			(1.479)	(0.369)
RISK_CAP			0.016**	0.010*
			(2.474)	(1.893)
INVEST_APPROVE			0.105	1.184**
			(0.187)	(2.553)
INV_MILLS			-5.929***	-0.307
			(-2.627)	(-0.165)
Year FE	Y	Y	Y	Y
Firm Clustered SE	Y	Y	Y	Y
Observations	181	181	147	147
Adjusted R-squared	0.297	0.211	0.319	0.295

Table 8—continued

This panel presents the results of estimating various compensation tests. Columns (1) and (2) present the model from Core et al. (2008) for normal compensation, including our measure of total shadow insurance (*Tot_Shadow*). This specification, without the Inverse Mills ratio, includes all firm-years in our sample period at the intersection of SNL and ExecuComp. Columns (3) and (4) add additional control variables from SNL Financial. For the estimation in columns (3) and (4), all firm-years have positive shadow insurance amounts, such that the Inverse Mills ratio (*Inv_Mills*) can be determined to control for selection bias. *Inv_Mills* is drawn from a first-stage specification similar to that in Table 4, except that all control variables in second-stage compensation test are present in the first-stage selection model. All variables are as defined in Appendix B. We present coefficients and, in parentheses, *t*-statistics for standard errors clustered at the firm-level. ***, **, and * represent statistical significance at the 1%, 5%, and 10% levels, respectively.