

Article

ESG, Taxes, and Profitability of Insurers

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Abstract: The growing concerns about sustainability urge insurance companies to implement Environmental, Social, and Governance (ESG) policies in order to remain competitive. All the three dimensions of corporate sustainability involve taxation; therefore, it is important to establish if this association reflects on financial performance. Our analysis of worldwide property and casualty (P&C) insurers during 2013–2022 reveals that high ESG insurers pay more taxes, while they are less profitable compared to low ESG insurers. This pattern is confirmed using instrumental variable regressions and simultaneous equations systems. We argue that sustainable insurers are less tempted to avoid taxes and do not shift their tax burdens onto policyholders and investors. However, the interplay between taxes and sustainability seems to harm insurers' profitability, potentially having negative effects on investment and economic growth. This is an important insight for tax authorities and insurance managers.

Keywords: insurance; ESG; sustainability; taxes

JEL Classification: G22; G32



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1. Introduction

Sustainability has three main dimensions—Environmental, Social and Governance (ESG)—and taxation is an essential element in each of them. Thus, appropriate tax policies would be pivotal in driving the transition of the whole economy to ESG. For example, tax exemptions incentivizing “green” investments could be part of the environmental pillar. Moreover, in order to enhance the social pillar, tax revenues could be used to improve firms' infrastructure, education, or health care. Finally, a sustainable governance would ensure transparent tax reporting, establishing trustworthy relationships between tax authorities and tax payers.

The insurance industry is a problematic area for tax policymakers. Its accounting systems are based on complex actuarial computations due to the lags between the assumptions of liabilities and payments; therefore, calculating insurance income can be a difficult task. Among different insurance segments, the taxation of property and casualty (P&C) insurers has generally been less complex than the taxation of life insurance. The reason is that the P&C business is a purer insurance business than life insurance, as its contracts are generally short term (one year) and do not have an explicit savings motive (https://www.oecd-ilibrary.org/taxation/taxing-insurance-companies_9789264188396-en (accessed on 6 September 2023)).

For this reason, in this article, we focus on the P&C segment to study taxation effects in the insurance sector. More precisely, our goal is to test whether corporate sustainability explains the effect of taxes on insurers' profitability. We analyze worldwide insurers during 2013–2022 and show that high ESG insurers pay more taxes, while they are less profitable than low ESG insurers. Our interpretation is that sustainable insurers are less tempted to manipulate earnings to avoid taxes, and they do not transfer their tax burdens to policyholders and investors.

Our work follows the insights from previous research in the fields of accounting and sustainability. Among studies focused on the accounting of financial intermediaries, we

follow [1,2]. The authors found that banks' profitability increases in effective tax rates, concluding that banks are able to shift their tax bills on depositors. Investigating this behavior inside insurers seems to be much important as well, as insurance customers include the wide base of policyholders.

Within the literature on corporate sustainability, Ref. [3] used data from Korean firms to prove that ESG mitigates incentives for tax avoidance. This argument can be a plausible explanation for our outcomes, as we show that effective tax rates decrease in ESG scores. The innovative and interesting contribution from our analysis is that we build a bridge between two topics of research, highlighting that promoting sustainability in insurance would require a careful tax planning, to avoid that declined profitability would constrain insurers' growth.

Our analysis delivers important insights for insurance managers engaged in strategic decisions, as we recommend to balance the benefits from sustainability with pitfalls related to increased tax burdens and harmed profitability. Furthermore, regulators and policymakers should be wise in preventing that ESG would translate into high taxes on insurers, reducing investment or quality.

The article is organized as follows. Section 2 relates our article to the most recent literature. Section 3 presents the data and the variables we use in the regression analysis. Section 4 shows the results. Section 5 concludes.

2. Review of the Literature

This article examines empirically the impact of corporate taxes on insurers' profitability, testing whether this relationship can partly be explained by ESG performances. Few streams of previous research relate to this topic. The first is the stream of research on the association between corporate sustainability and financial performance. Previous studies focused mainly on non-financial firms, revealing heterogeneous evidence. Refs. [4,5] offer comprehensive reviews of the literature dealing with the effect of corporate sustainability on performance, reporting that these two aspects are positively correlated in the large majority of the articles. In a recent meta-analysis, instead, Ref. [6] contend that the existing evidence is more mixed with considerable shares of research pointing to a negative, mixed, or even not-existing relationship.

In this article, we focus on the insurance sector. The unique nature of the insurance business makes the taxation of insurers a difficult task, which in many aspects is not comparable to other sectors. In fact, the calculation of pre-tax income is less straightforward, as insurers' accounting systems involve actuarial computations due to the lags between the assumptions of liabilities and payments. Within the insurance sector though, taxation issues seem to be less complex for property and casualty (P&C) insurance (also called "general" insurance) compared to life insurance (https://www.oecd-ilibrary.org/taxation/taxing-insurance-companies_9789264188396-en (accessed on 6 September 2023)). For P&C insurers, "taxes are both important and, to a large extent, controllable. Whereas the income of most organizations is fully taxable, P&C insurance companies' income is largely investment income which can be either taxable or tax exempt." P&C insurers in the US fall under different sections of the tax code than mutuals and life insurers; therefore, it seems appropriate that tax behaviors should be examined separately (https://www.casact.org/sites/default/files/database/proceed_proceed71_71001.pdf (accessed on 6 September 2023)). P&C insurers accept premiums from policyholders for the insurance of risks related to damage to property, personal injury, or public liability for damage to third parties or to their property. Therefore, insurance contracts are generally short-term (one year) and do not have an explicit savings motive.

This implies that many tax issues in P&C insurance are different than in life insurance. Unlike most P&C businesses, the determination of profit or loss for a life insurer can take many years due to the long-term nature of many life insurance contracts. Indeed, not until all policyholders and claims are paid out can a life insurer ascertain its underwriting profit (https://www.oecd-ilibrary.org/taxation/taxing-insurance-companies_9789264188

396-en (accessed on 6 September 2023)). Given these differences in the assessment of the underwriting income among segments, we focus on P&C insurance to investigate the role of taxes in channeling the impact from corporate sustainability on profitability.

In the earlier literature, some articles focused on P&C insurance to show that investment behaviors could reveal tax management strategies. In fact, P&C insurers are major participants in the market for tax-exempt (municipal) bonds. When insurance risks are not fully diversifiable, the allocation between taxable and tax-exempt securities will affect the competitive premium and/or the solvency risk of the company [7].

Ref. [8] document that tax-exempt bonds allow P&C insurers to maximize their profits and minimize taxes. Ref. [9] examine the Tax Reform Act (TRA) of 1986 to show that although the TRA reduced investment incentives for institutional investors (primarily banks), P&C insurers continued to reveal an incentive to participate in the tax-exempt bond market. Using portfolio data for California insurers, Ref. [10] prove that also equity issuances can be informative about tax-sheltering behaviors, as the authors find that insurers with higher equity invested more in tax-favored securities.

In the literature, the evidence about the effects from sustainability on insurers' financial performance is much more narrow. Ref. [11] measures the stock market performance of US insurers using monthly stock market returns during 2013–2022, showing that high ESG insurers exhibit also highly positive abnormal returns. In this article, we assess insurers' financial performance from the return-on-assets (ROA). Few studies use ROA to assess ESG effects on profitability. However, the evidence is mixed, as for example [12,13] discover that ESG has a positive effect on ROA, while [14] find the opposite.

In addition to profits, previous research proves that sustainability policies affect in a considerable way also other aspects of insurers. These include, for example, distress risk [15], financial strength [11], and reinsurance [16]. Our article contributes to this literature by corroborating the importance of sustainability for insurers' decision making, pointing out that ESG plays a joint role on taxes and financial performance.

The relationship between taxes and profits is informative on tax avoidance activities, i.e., one of the most important and studied questions in tax research. The empirical evidence on this subject is mixed. For example, Refs. [17–19] find that firms that are more profitable have lower effective tax rates. In contrast, Refs. [20,21] report a positive and significant association between profitability and effective tax rates, while the correlation is not statistically significant in the articles of [22,23].

In the banking industry, there is evidence for this behavior, as [1,2] show that banks' profitability increases in effective tax rates, and they interpret the findings, arguing that banks shift their tax bills to depositors and lenders. We now build a bridge with the tax avoidance literature by showing results for insurance companies. In fact, insurers, as with other financial intermediaries, are much often excluded from samples of empirical analyses due to the nature of their business and regulation, which make them hardly comparable to other sectors.

Scholars do not agree on whether taxes and ESG are interrelated (Analyzing data from 2003 to 2020, Ref. [24] uses a scientometric approach to investigate the nexus between corporate social responsibility and corporate tax aggressiveness research). Recently, Ref. [3] found a negative relationship between Korean firms' ESG scores and tax avoidance, which is measured in terms of book–tax income differences computed during 2011–2017. This suggests that high ESG firms pay high taxes, and the authors contend that such behavior is explained by corporate culture theory [25,26], as firms with good corporate social performance are not tempted to manipulate taxable profits. In contrast, Ref. [27] illustrates that corporate social responsibility engagement reduces the reputation risk due to tax avoidance, thus hedging the value of more aggressive firms. Ref. [23] points to more heterogeneous effects, as the analysis of Compustat firms during 2002–2011 reveals that corporate social responsibility is negatively related to five-year cash effective tax rates, while it is positively related to tax lobbying expenditures. Our article extends this previous

evidence, testing whether in the insurance sector, the interplay between taxes and ESG is economically significant.

3. Data and Variables

We use Standard and Poor's Capital IQ and select all property and casualty (P&C) insurers worldwide that report not missing annual information on ESG scores from 2013 until 2022. All firms are operating and publicly listed at the end of 2022, while firms that went bankrupt or were subject to mergers and acquisitions (M&As) before 2022 are excluded from our sample. For these companies, we also download from the category "S&Ps Global Universal Financials" balance sheet and income statement figures. (This information is provided based on the company filings. We acknowledge that focusing on a single segment of insurance may constrain the sample size, because in our data source, ESG ratings are available only starting from year 2013. However, recent articles on insurance sustainability face similar limitations in having data at their disposal. Our sample would be comparable in size to the datasets examined by [15] on American insurers and by [11] on global P&C insurers). The Appendix A reports the list of the companies included in our sample, which have been separated into geographical regions.

In the next section, we conduct a regression analysis that uses the following variables, for which Table 1 reports descriptive statistics, while Table 2 reports correlation coefficients. *ESG* is the ESG score computed by S&P Capital IQ, i.e., a discrete number ranging 0–100 reflecting the performance of the company on key environmental, social, and governance issues according to an industry specific assessment methodology and aggregation schemes. Higher values of ESG scores indicate a stronger performance on sustainability practices. The S&P ESG ratings are elaborated from information in the Corporate Sustainability Assessment (CSA), information provided directly to S&P and certified by analysts, and public domain information. The separate pillars are called *E*, *S*, and *G*, and the scale is again 0–100. (More information on the methodology employed by S&P Capital IQ to compute ESG ratings can be found at <https://www.spglobal.com/esg/csa/methodology/> (accessed on 15 August 2023). While the majority of the studies use levels of ESG scores, we checked that using natural logarithms of ESG scores will not change the quality of our outcomes [28]).

Using accounting figures, we measure the company's profitability. *ROA* is the return-on-assets, i.e., the ratio of net income to total assets. For robustness, we also test the return-on-equity, and *ROE* is the ratio of net income to book value equity. Both measures are widely employed in the industry as well in the academia as proxies for profitability, and we will use the two quantities as dependent variables in our regressions.

To approximate corporate taxes, we use the effective tax rate, i.e., *ETR* is the ratio of income tax expenses to earnings before taxes (including unusual items). *ETR* is an approximation of aggressive tax reporting, defined as the downward manipulation of taxable income through tax planning, which may or may not be considered fraudulent tax evasion [29]. In general, tax aggressiveness is not measurable; therefore, researchers use proxies to assess companies' behaviors addressed to avoid taxes. Among these quantities, *ETR* is widely employed by scholars [30–34], and it is based on the assumption that a huge weight of tax liabilities with respect to pre-tax income reflects a low incentive to avoid taxes. On average, *ETR* is close to 20% (see Table 1). For example, Ref. [23] estimates that the average *ETR* computed across all Compustat firms during 2002–2011 was 26% (Following the definition of [29], tax-reporting aggressiveness would reflect a broad range of activities, e.g., transfer pricing arrangements, location of intangible property in low-tax locations, utilization of flow-through entities in structured transactions, synthetic lease arrangements, and tax shelter transactions). For robustness, we test two additional measures of tax burden, i.e., the log-amounts of income taxes (*INCTX*) and of provisions for taxes (*PROVTX*). The quantities *ETR*, *INCTX*, and *PROVTX* will be the independent variables in the regressions presented in the next section.

Finally, all our specifications control for corporate size; thus, *SIZE* calculates the natural logarithm of total assets. Table A1 in the Appendix A summarizes the definitions of our variables.

Table 1. Descriptive statistics.

	Mean	Median	Min	Max	St Deviation	N
<i>ESG</i>	31.54	22.50	1	85	23.19	388
<i>E</i>	27.56	16	0	97	29.97	388
<i>S</i>	25.1	15	0	86	25.66	388
<i>G</i>	38.71	35	1	87	20.89	388
<i>ROA</i>	0.023	0.020	0.000	0.118	1.994	354
<i>ROE</i>	0.109	0.101	0.000	0.583	11.280	357
<i>ETR</i>	0.198	0.205	0.000	0.847	17.66	332
<i>INCTX</i>	11.735	11.86	7.4771	15.949	1.753	348
<i>PROVTX</i>	11.691	11.783	6.457	15.945	1.724	333
<i>SIZE</i>	16.953	17.131	10.290	21.042	1.596	357

See Appendix A Table A1 for the definitions of all variables.

Table 2. Correlation coefficients.

	<i>ESG</i>	<i>E</i>	<i>S</i>	<i>G</i>	<i>ROA</i>	<i>ROE</i>	<i>ETR</i>	<i>INCTX</i>	<i>PROVTX</i>	<i>SIZE</i>
<i>ESG</i>	1.000									
<i>E</i>	0.964 ***	1.000								
<i>S</i>	0.979 ***	0.947 ***	1.000							
<i>G</i>	0.951 ***	0.870 ***	0.887 ***	1.000						
<i>ROA</i>	−0.127 *	−0.149 **	−0.148 **	−0.078	1.000					
<i>ROE</i>	−0.002	−0.033	−0.002	0.027	0.800 ***	1.000				
<i>ETR</i>	0.165 **	0.151 **	0.188 ***	0.138 *	0.055	0.035	1.000			
<i>INCTX</i>	0.172 **	0.154 **	0.159 **	0.200 ***	0.179 **	0.275 ***	0.222 ***	1.000		
<i>PROVTX</i>	0.168 **	0.144 **	0.148 **	0.205 ***	0.126 *	0.207 ***	0.223 ***	1.000 ***	1.000	
<i>SIZE</i>	0.259 ***	0.264 ***	0.231 ***	0.292 ***	−0.105 *	0.049	0.001	0.846 ***	0.838 ***	1.000

See Appendix A Table A1 for the definitions of all variables. *** $p < 0.01$, ** $p < 0.05$, * $p < 0.1$.

In Table 3, we separate our firms into four quantiles of *ESG* and compute averages of variables. Firms in the first (fourth) quantile are the least (most) sustainable. We observe that the most sustainable insurers have the highest *ETR* equal to 23.7%, which is approximately 28% higher than the *ETR* of the least sustainable insurers. The most sustainable insurers are also less profitable, as their *ROA* is 1.7%, i.e., 15% smaller than the *ROA* of the least sustainable insurers.

Table 3. Averages of variables inside quantiles of *ESG*.

Quantile	<i>ETR</i> (%)	<i>INCTX</i>	<i>PROVTX</i>	<i>ROA</i> (%)	<i>ROE</i> (%)
1	16.9833	10.6697	10.6023	2.0501	7.6192
2	18.2180	11.7594	11.7432	2.3844	11.4781
3	19.6513	12.3129	12.2860	2.8088	14.4319
4	23.7482	12.0489	11.9629	1.7479	9.7313

See Appendix A Table A1 for the definitions of all variables.

4. Results

Our goal is to test whether effects from sustainability on taxes would impact financial performances. Therefore, we first check the relationship between profitability and taxes without controlling for sustainability. In this way, we can establish if important changes in this association would occur, as we consider sustainability effects. Our regressions are summarized with the following Equation (1), where the subscripts j and t denote, respectively, the company and the year:

$$Profitability_{p,j,t} = \alpha_0 + \alpha_1 Taxes_{s,t-1} + \alpha_2 SIZE_{j,t-1} + \tau_t + \omega_{j,t}. \quad (1)$$

The subscript p indicates insurer j 's profitability, which is measured alternatively by ROA and ROE . The subscript s denotes the measure for taxes among ETR , $INCTX$, and $PROVTX$. τ_t are time fixed effects, while $\omega_{j,t}$ is the error term. Standard errors are robust (We tested also models where we clustered standard errors by firm, by geographical regions, or by country. The results are consistent with those reported in the text and are available upon request).

In Table 4 we find that taxes are positive and significant in all regressions, meaning that increasing taxation would enhance financial performances. Now, implementing a two-step instrumental variable procedure, we consider the effect of sustainability on the estimated relationship. In the first step, we run the regression of taxes on ESG scores, while in the second step, we run the regression of profitability on taxes predicted from the first step regression. (We tested additional models to alleviate potential endogeneity concerns. More precisely, our baseline outcomes in Table 4 are confirmed using (i) the contemporaneous ESG rather than the one period lagged ESG , and including (ii) an interaction term between ESG and dummy variables for the year 2015 (Paris Climate Agreement), the year 2020 (COVID-19 pandemic), and the year 2022 (Russia–Ukraine war). The sign on the interaction terms is negative, and it does not differ substantially from the sign estimated at other points in time. Thus, although these events affected insurers' profitability, they do not seem to be the main driver for our baseline results. The outcomes from (i) and (ii) are available upon request. Finally, we acknowledge that issues of international taxation may involve our dataset. The picture is also complicated by the fact that a liberalizing trend has involved the insurance sector globally in the last decades. Upon certain conditions, in many OECD countries, insurance contracts can now be written by non-residents (https://www.oecd-ilibrary.org/finance-and-investment/liberalisation-of-international-insurance-operations_9789264073074-en-fr (accessed on 7 September 2023)). However, including in our sample all geographical regions allows us to have a reasonable number of annual ESG ratings to analyze. For all industries, S&P Capital IQ provides the availability of ESG scores starting from the year 2013; therefore, if we were to focus only on one country, we would be constrained by a too small number of P&C insurers. To address the concern that differences in taxation could potentially affect our outcomes, we run the regressions in (2) adding an entire set of country dummies. All coefficients have same sign as in Table 4, although these are less statistically significant. These results are available upon request).

The procedure is summarized as follows:

$$\begin{aligned} Taxes_{s,j,t} &= \alpha_0 + \alpha_1 ESG_{j,t-1} + \alpha_2 SIZE_{j,t-1} + \tau_t + \omega_{j,t} \\ Profitability_{p,j,t} &= \beta_0 + \beta_1 \hat{Taxes}_{s,j,t} + \psi_t + \epsilon_{j,t}. \end{aligned} \quad (2)$$

$\hat{Taxes}$ are taxes predicted from the first-step regression. τ_t and ψ_t are time fixed effects, while $\omega_{j,t}$ and $\epsilon_{j,t}$ are error terms. Standard errors are robust. This method measures the effect from taxes predicted by sustainability on profitability at the net of size effects and time fixed effects. Table 4 reports the outcomes from the second-step regression of ROA (Panel A) and ROE (Panel B). We observe that differently than in Table 5, the sign on taxes is negative. That is, profitability declines in the taxes, which is explained by corporate sustainability. This pattern would reveal that insurers do not shift a considerable share of their tax bills to their customers.

Table 4. Results from OLS model in (1) with dependent variables *ROA* and *ROE*.

Variables	(1) <i>ROA</i>	(2) <i>ROA</i>	(3) <i>ROA</i>	(4) <i>ROE</i>	(5) <i>ROE</i>	(6) <i>ROE</i>
<i>ETR</i>	0.0049 (0.9162)			0.0151 (0.5211)		
<i>INCTX</i>		0.0023 *** (3.8295)			0.0170 *** (5.2048)	
<i>PROVTX</i>			0.0017 *** (2.7457)			0.0125 *** (3.7443)
Controls	Yes	Yes	Yes	Yes	Yes	Yes
Observations	305	319	305	305	321	307
R-squared	0.1112	0.0654	0.0466	0.0335	0.0878	0.0552

See Appendix A Table A1 for the definitions of all variables. Controls include a constant term, *SIZE*, and time fixed effects. *t*-statistics in parentheses. *** $p < 0.01$.

Table 5. Results from second-step regression in (2) for *ROA* (Panel A) and *ROE* (Panel B).

Panel A			
Variables	(1) <i>ROA</i>	(2) <i>ROA</i>	(3) <i>ROA</i>
$\hat{ETR}$	−0.1670 ** (−2.044)		
$\hat{INCTX}$		−0.0028 *** (−3.2962)	
$\hat{PROVTX}$			−0.0030 *** (−3.5023)
Controls	Yes	Yes	Yes
R-squared	0.0218	0.0696	0.0671
Panel B			
Variables	(1) <i>ROE</i>	(2) <i>ROE</i>	(3) <i>ROE</i>
$\hat{ETR}$	−0.4297 * (−1.5912)		
$\hat{INCTX}$		−0.0057 (−1.2511)	
$\hat{PROVTX}$			−0.0075 * (−1.6483)
Controls	Yes	Yes	Yes
R-squared	0.0219	0.0672	0.0671

See Appendix A Table A1 for the definitions of all variables. Controls include a constant term, *SIZE*, and time fixed effects. *t*-statistics in parentheses. *** $p < 0.01$, ** $p < 0.05$, * $p < 0.1$.

In order to test the robustness of the baseline outcomes, we estimate simultaneous equations systems, assuming that firms determine contemporaneously profitability, effective tax rates, and corporate sustainability. In this way, we test how ESG scores at t relate to profitability and taxes at the same point in time (We verified that results do not change in quality as we approximate taxes with *INCTX* and *PROVTX*. These results are available upon request). The equations are summarized as follows:

$$\begin{aligned} Taxes_{s,j,t} &= \gamma_0 + \gamma_1 ESG_{j,t} + \gamma_2 SIZE_{j,t} + \zeta_{j,t} \\ Profitability_{p,j,t} &= \lambda_0 + \lambda_1 ESG_{j,t} + \eta_{j,t}. \end{aligned} \quad (3)$$

Table 6 displays results for the equations systems in (3) for *ROA* (Panel A) and *ROE* (Panel B). Overall, the simultaneous equations systems deliver results consistent with the outcomes from the models in (2). In fact, in the large majority of the systems, the sign on *ESG* in the first equation is positive and significant, while in the second equation, the sign on

ETR is negative and significant. That is, assuming profits and taxes are determined jointly, insurers' profitability declines in the taxes explained by sustainable corporate practices. We note that the sign of *ESG* on *ETR* is positive and highly significant, suggesting that taxes increase with corporate sustainability, which is in line with the previous evidence of [3].

Table 6. Results from simultaneous equations systems in (3) for *ROA* (Panel A) and *ROE* (Panel B).

Panel A						
Variables	<i>ETR</i>	<i>ROA</i>	<i>INCTX</i>	<i>ROA</i>	<i>PROVTX</i>	<i>ROA</i>
<i>ESG</i>	0.0012 *** (2.6991)		0.0020 (1.3083)		0.0027 * (1.7023)	
<i>ETR</i>		−0.1595 ** (−2.3397)				
<i>INCTX</i>				−0.0024 *** (−3.0675)		
<i>PROVTX</i>						−0.0032 *** (−3.9293)
Controls	Yes	Yes	Yes	Yes	Yes	Yes
Observations	305	305	319	319	305	305
R-squared	0.0601	−2.7773	0.0719	−0.1177	0.0703	−0.1551
Panel B						
Variables	(1) <i>ETR</i>	(2) <i>ROE</i>	(3) <i>INCTX</i>	(4) <i>ROE</i>	(5) <i>PROVTX</i>	(6) <i>ROE</i>
<i>ESG</i>	0.0013 *** (2.7581)		−0.0011 (−0.5753)		−0.0012 (−0.6445)	
<i>ETR</i>		−0.4411 * (−1.8171)				
<i>INCTX</i>				−0.0025 (−0.6143)		
<i>PROVTX</i>						−0.0078 * (−1.8531)
Controls	Yes	Yes	Yes	Yes	Yes	Yes
Observations	305	305	319	319	305	305
R-squared	0.0691	−0.0797	0.0722	0.0161	0.0710	0.0601

See Appendix A Table A1 for the definitions of all variables. Controls include a constant term, *SIZE*, and time fixed effects. z-statistics in parentheses. *** $p < 0.01$, ** $p < 0.05$, * $p < 0.1$.

Finally, we use *E*, *S*, and *G* separately in the instrumental variable model in (2) (We have tested the three pillars also using *ROE* as the dependent variable, beside implementing the simultaneous equations systems in (3). The results do not change in quality compared to the results obtained using the composite rating. Therefore, they are available upon request). In the panels of Table 7, we show second-step regressions of *ROA* on taxes explained by the three pillars of sustainability. The estimated signs are negative and higher in magnitude for *S* and *E*, while *G* does not have a considerable role on profitability through its impact on *ETR*. The social element of *ESG*, in particular, seems to be a field where taxes could improve *ESG* commitments quite substantially. In fact, the perspective of the *S* pillar focuses on the human aspects of the business, such as human rights, labor standards, social justice, pay equity, product safety, community engagement, and inclusion. Companies could demonstrate their commitment and build trustworthy relationships with stakeholders by means of tax policies, such as for example tax credits or enhanced transparency in the tax-reporting frameworks.

Table 7. Results from second-step regressions in (2) for ROA.

Panel A: Effects from Taxes Explained by E			
Variables	(1) ROA	(2) ROA	(3) ROA
$E\hat{T}R$	−0.1723 ** (−2.0827)		
$IN\hat{C}TX$		−0.0027 *** (−3.2092)	
$PRO\hat{V}TX$			−0.0029 *** (−3.4059)
Controls	Yes	Yes	Yes
Observations	254	252	263
R-squared	0.0146	0.0675	0.0675
Panel B: Effects from Taxes Explained by S			
Variables	(1) ROA	(2) ROA	(3) ROA
$E\hat{T}R$	−0.1423 ** (−2.4425)		
$IN\hat{C}TX$		−0.0028 *** (−3.2807)	
$PRO\hat{V}TX$			−0.0029 *** (−3.4611)
Controls	Yes	Yes	Yes
Observations	254	252	263
R-squared	0.0258	0.0694	0.0694
Panel C: Effects from Taxes Explained by G			
Variables	(1) ROA	(2) ROA	(3) ROA
$E\hat{T}R$	−0.2134 (−1.4122)		
$IN\hat{C}TX$		−0.0029 *** (−3.3854)	
$PRO\hat{V}TX$			−0.0031 *** (−3.6197)
Controls	Yes	Yes	Yes
Observations	254	252	263
R-squared	0.0095	0.0640	0.0641

See Appendix A Table A1 for the definitions of all variables. Controls include a constant term, *SIZE*, and time fixed effects. *t*-statistics in parentheses. *** $p < 0.01$, ** $p < 0.05$.

5. Conclusions

Taxes are a crucial part in the transition of the economy to ESG. Especially in the insurance sector, the ESG agenda should give a high priority to tax issues. In fact, determining taxable income in insurance is a challenging task, and it is hardly comparable to other sectors. Therefore, it is important to establish if the integration of ESG would interfere with corporate taxation, harming insurers' financial conditions. Analyzing worldwide P&C insurers during 2013–2022, we show that high ESG insurers pay more taxes, while they are less profitable than low ESG insurers. The results suggest that high ESG insurers are less tempted to avoid taxes, and they do not shift tax burdens to policyholders.

These outcomes deliver important insights to insurance managers and policymakers. Managers should consider that implementing ESG would require a careful tax planning, aimed at preventing negative consequences on profitability, like decreased competitiveness [35] or harmed reputation [36].

Policymakers discover that strong ESG performances could increase customers' welfare, as policyholders of high ESG insurers would not bear huge tax burdens on their

premiums. However, our findings raise some warnings too, as we advise regulators and policymakers that future tax policies should not raise tax expenditures for sustainable insurers, because this could ultimately reduce firm investments [37] and economic growth [38].

Therefore, our results corroborate the recent regulatory interventions worldwide giving taxes a key role in stimulating sustainable behaviors among taxpayers. For example, the European Commission has included a number of tax measures in the European Green Deal, such as the Carbon Border Adjustment Mechanism (CBAM) (https://taxation-customs.ec.europa.eu/carbon-border-adjustment-mechanism_en (assessed on 4 August 2023)), the Energy Taxation Directive (ETD) (https://taxation-customs.ec.europa.eu/green-taxation-0/revision-energy-taxation-directive_en (assessed on 15 August 2023)), and the country-by-country reporting Directive (CbCR) (<https://eur-lex.europa.eu/legal-content/EN/TXT/PDF/?uri=CELEX:32021L2101> (assessed on 15 August 2023)). The United States Inflation Reduction Act (IRA) (<https://www.congress.gov/117/bills/hr5376/BILLS-117hr5376enr.pdf> (assessed on 15 August 2023)) is also based on a wide range of tax credits and incentives that are meant to facilitate the US economy's sustainable transformation.

Overall, interventions on the taxation of insurance companies should always take into consideration the importance of sustainable insurers for the transition of the economy to ESG. For example, the Geneva Association highlights the key role of insurers in creating "social benefits by weaving social considerations through their core insurance activities" (https://www.genevaassociation.org/sites/default/files/2022-11/social_sustainability_report.pdf (assessed on 15 August 2023)). The European Insurance and Occupational Pensions Authority (EIOPA) gives emphasis to the role of insurers in tackling climate change, filling the existing gap in worldwide insurance against catastrophes and climate-related events (https://www.eiopa.europa.eu/publications/role-insurers-tackling-climate-change-challenges-and-opportunities_en (assessed on 1 September 2023)).

While this article contributes to filling an important gap in the knowledge surrounding ESG and the taxes of insurers, further tasks were not addressed and left to future research. For example, we measured taxes primarily using the company's effective tax rate, which does not capture non-conforming tax avoidance. For this reason, scholars have implemented other measures for tax aggressiveness based on publicly available financial statement data. A few measures suggested by the literature include, for example, the cash effective tax rate [30], the book tax different [39], and the permanent book tax different [40]. Ref. [29] uses the discretionary value/residual value of the permanent book tax difference to develop the discretionary permanent different, which would be a quantity more suitable to capturing conforming tax avoidance. Therefore, we leave to accounting research the task of corroborating our results using these (and potentially other) measures, verifying how sustainability would induce changes in tax behaviors and tax compositions, ultimately reflecting on profits.

Moreover, we leave to research activity focused on corporate sustainability the goal of extending our approach to other sectors, asking whether the interplay between taxes and sustainability explains profits in other businesses. In this regard, it would be particularly interesting to address environmental taxes inside industrial firms, as traditionally, the most dominant pillar of ESG was the E; therefore, environmental strategies were often the subject of tax policies.

Finally, the recent changes in worldwide tax rules that we mentioned above could be examined with event study methodologies to test whether the new regimes would lead firms to be effectively more transparent while not financially weaker. Evidently, these analyses require a sufficient number of observations which are not available yet; therefore, they will be part of future research projects.

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Appendix A

List of companies in the sample:

Asia-Pacific: Anicom Holdings Inc., DB Insurance Co., Ltd., Dhipaya Group Holdings Public Company Limited, Dream Incubator Inc., Hyundai Marine & Fire Insurance Co., Ltd., ICICI Lombard General Insurance Company Limited, Insurance Australia Group Limited, MS&AD Insurance Group Holdings Inc., Meritz Financial Group Inc., QBE Insurance Group Limited, Samsung Fire & Marine Insurance Co., Ltd., Shinkong Insurance Co., Ltd., Sompo Holdings Inc., Suncorp Group Limited, The People's Insurance Company (Group) of China Limited, Tokio Marine Holdings Inc.

Europe: Admiral Group Plc, Alm. Brand A/S, Beazley Plc, Chubb Limited, Direct Line Insurance Group Plc, Linea Directa Aseguradora S.A., Sabre Insurance Group Plc, Tryg A/S.

Latin America and Caribbean: Qualitas Controladora S.A.B. de C.V.

Middle East: Qatar Insurance Company Q.S.P.C.

Unite States and Canada: AMERISAFE Inc., AXIS Capital Holdings Limited, Ambac Financial Group Inc., American Financial Group Inc., Arch Capital Group Ltd., Argo Group International Holdings Ltd., Assured Guaranty Ltd., Cincinnati Financial Corporation, Employers Holdings Inc., Erie Indemnity Company, Fairfax Financial Holdings Limited, HCI Group Inc., Hallmark Financial Services Inc., Heritage Insurance Holdings Inc., Hiscox Ltd, Intact Financial Corporation, James River Group Holdings Ltd., Kemper Corporation, Kinsale Capital Group Inc., Lancashire Holdings Limited, Loews Corporation, Markel Corporation, Mercury General Corporation, Old Republic International Corporation, Palomar Holdings, Inc., ProAssurance Corporation, RLI Corporation, Safety Insurance Group Inc., Selective Insurance Group Inc., The Allstate Corporation, The Hanover Insurance Group Inc., The Progressive Corporation, The Travelers Companies Inc., Trisura Group Ltd., United Fire Group Inc., United Insurance Holdings Corp., Universal Insurance Holdings Inc., W. R. Berkley Corporation, White Mountains Insurance Group Ltd.

Table A1. Definition of variables.

Variable	Definition
<i>E</i>	Company's environmental score. The environmental score is a discrete number and ranges 0–100.
<i>ESG</i>	Company's environmental, social, and governance (ESG) score. The ESG score is a discrete number and ranges 0–100.
<i>ETR</i>	Ratio of income tax expenses to earnings before taxes (including unusual items).
<i>G</i>	Company's governance score. The governance score is a discrete number and ranges 0–100.
<i>INCTX</i>	Natural logarithm of income taxes.
<i>PROVTX</i>	Natural logarithm of provisions for taxes.
<i>ROA</i>	Ratio of net income to total book value assets.
<i>ROE</i>	Ratio of net income to total book value equity.
<i>S</i>	Company's social score. The social score is a discrete number and ranges 0–100.
<i>SIZE</i>	Natural logarithm of total assets.

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