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WHY DID SHAREHOLDER LIABILITY DISAPPEAR?

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Working Paper 22-12

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Why did shareholder liability disappear?*

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Abstract

Why did shareholder liability disappear? We address this question by looking at its use by British insurance companies from 1830 until its complete disappearance by 1975. We explore three explanations for its demise: (1) regulation and government-provided policyholder protection meant that it was no longer required; (2) it had become *de facto* limited; and (3) shareholders saw an opportunity to expunge something they disliked when insurance companies grew in size. Using hand-collected archival data, our findings suggest investors attached a risk premium to shareholder liability, and it was phased out after a merger movement increased the size of insurance companies which meant that they were better able to pool risks.

JEL Classification: G11, G22, N20, N40

Keywords: Insurance, regulation, shareholder liability, United Kingdom

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1. Introduction

In its final edition of the last millennium, *The Economist* claimed that "limited liability is the key to industrial capitalism, and has ultimately transformed the world". Limited liability is ubiquitous in modern financial systems, but its potential role in exacerbating risk taking by financial institutions has been recently emphasized by economists (Aldunate et al., 2021). Scholarship on the U.S. banking system both during and before the Great Depression suggests that banks with double liability were less likely to fail (Grossman, 2001; Aldunate et al., 2021). In the light of the global financial crisis of 2008, some scholars have even gone as far as to advocate a return of shareholder liability or a form of increased-liability equity for banks and bankers (Admati and Pfleiderer, 2009; Ridyard, 2013; Hendrickson, 2014; Goodhart and Lastra, 2020). This raises at least two pertinent questions about systems with shareholder liability. First, when and why did shareholder liability disappear? Second, what substitutes were used to replace it?

In this paper, we address these questions by looking at the use of shareholder liability by British insurance companies over 150 years. The British insurance industry is an important case study for several reasons. First, British insurance companies have a long tradition, stretching back to before 1720 (Raynes, 1964; Supple, 1970; Harris, 2000; Frehen et al., 2013). Second, the British insurance industry insured much of the world's merchant fleet in the nineteenth and twentieth centuries and its life and fire insurance companies had many offices across the globe by 1900 (Pearson, 1997; Wilkins, 2009). Third, from its inception and until the 1970s, insurance companies were the largest institutional investors in the UK and therefore an important participant in capital markets (Bogle et al., 2022). Fourth, and most importantly, there has been a long tradition of the owners of British insurance businesses being liable for more than the share capital they have invested. This is most prominent with the Names of Lloyds of London, who until very recently had personal unlimited liability as partners in the insurance syndicates that constituted Lloyds.

However, shareholder liability was also common in British insurance companies from their inception until the early 1970s.

In this paper, we explore three possible explanations as to why this shareholder liability disappeared. The first explanation we examine is that regulation and government-provided policyholder protection meant that shareholder liability was no longer required. We find that all companies had expunged their shareholder liability many years and in some cases decades before the passage of the Policyholders Protection Act in 1975. Furthermore, there were no regulatory changes during or even immediately after the period when shareholder liability was expunged.

The second explanation we examine is that shareholder liability was expunged because it was largely irrelevant in that it had become a husk without a kernel. One plausible reason for this irrelevance is that there may have been nothing to prevent shares being sold to individuals who would have been unable to pay calls on them, because insurance company shares were freely transferable (Winton, 1993). In other words, the liability may have been de jure extended, but de facto limited. Thus, expunging shareholder liability was simply acknowledging what was already a reality. We have obtained unique archival data on shareholder wealth for one large insurance company to analyze this hypothesis. Using this data, we find that shareholders had more than enough wealth to cover potential calls on their shares.

An alternative explanation is that when insurance companies grew in size their shareholders were able to expunge it. Larger insurance companies were better able to pool risks and therefore much less likely to default on their policies. This meant they no longer needed shareholder liability, which was unpopular with their shareholders because it increased their risk, to provide assurance to policyholders that they would receive a payout when making a claim. We test for this possibility in two stages.

First, we compare the risk-adjusted returns for insurance companies with and without shareholder liability. If it did not matter to shareholders, then we would expect the risk-adjusted returns on insurance company shares with shareholder liability to be the same as those with limited liability. To perform this analysis, we use hand-collected monthly share prices for over 100 insurance companies from 1830 until 1929. We then sort insurance company shares into portfolios based on whether or not they had shareholder liability and run Fama-MacBeth (1973) regressions with shareholder liability as an explanatory variable. We find that insurance company stocks with shareholder liability had a higher return than insurance company stocks with limited liability, which suggests that shareholder liability was priced in by investors.

Second, to test for the possibility that increased firm size coincided with the demise of shareholder liability, we hand collected financial statement data on over 100 insurance companies. We then look at the relationship between firm size and shareholder liability, controlling for other insurance company characteristics. Our findings suggest that size was an important determinant of the level of shareholder liability that insurance companies possessed, and was also a good predictor of the disappearance of shareholder liability. Lastly, we find that mergers, the principal means by which insurance companies became larger, also improved the diversification of insurance companies. These findings are consistent with the explanation that shareholder liability was expunged because insurance companies became safer and less volatile as they grew.

The secondary issue we examine is whether the reduction of shareholder liability was successfully managed. To address this issue, we analyze the shareholder response by performing an event study on cases where shareholder liability was reduced. Our findings suggest that there was no effect of reductions in shareholder liability on stock prices around the time of reduction.

This absence of reaction is explained by the fact that most high reductions in shareholder liability coincided with the capitalization of reserves.

This paper is related to a broader literature on the role of shareholder liability and risk-taking in the banking sector. This literature finds that shareholder liability reduced bank risk taking in the U.S. and UK (Esty, 1998; Grossman, 2001; Mitchener and Richardson, 2013; Grossman and Imai, 2013; Turner, 2014; Bodernhorn, 2015; Goodspeed, 2017; Koudijs et al., 2021; Aldunate et al., 2021). However, the evidence from other countries does not find this relationship (Grodecka and Kotidis, 2016; Colvin, 2018; Kenny and Ögren, 2021). Furthermore, shareholder liability did not guarantee stability during the Great Depression or times of widespread financial distress (Grossman, 2001; Hickson and Turner, 2002; Anderson et al., 2018). Our contribution to this literature is to focus on the role of shareholder liability in the insurance industry, which to the best of our knowledge has been ignored by previous scholars.

Another strand of the literature that our paper directly speaks to is that dealing with the demise of shareholder liability in the financial sector. Vincens (1957) suggests that the experience with attempts to collect assessments during the Great Depression revealed that double liability in the U.S. provided little in the way of protection for depositors. This claim is challenged by Macey and Miller (1992). Wilson and Kane (1996) argue that the U.S. banking panics of the early 1930s changed the calculus for large shareholders of banks, with the result that they lobbied for and obtained federal deposit insurance as a replacement for double liability. Our paper contributes to this literature by looking at insurance and a country apart from the United States. We find that industry consolidation, rather than regulation or potential problems with assessments, meant that shareholder liability was no longer required.

Our paper also contributes to the literature on shareholder liability in the UK. To date, this literature has focused on the introduction of general limited liability in incorporation law and the political economy of this introduction (Shannon, 1931; Ireland, 1984; Bryer, 1997), the prevalence of shareholder liability (Jefferys, 1946; Acheson et al., 2012), and its role in banking (Acheson and Turner, 2008; Turner, 2009; Lee, 2012; Turner, 2014). Our paper augments this literature by explicitly addressing for the first time the question of why shareholder liability disappeared in the UK.

The next section of the paper outlines the stylized facts regarding the disappearance of shareholder liability and outlines our hypotheses. Section 3 describes our data. Section 4 examines the relationship between safety nets, regulation and the demise of shareholder liability. Section 5 tests the hypothesis that shareholder liability was de facto limited. Section 6 analyzes whether companies with shareholder liability had a higher cost of capital because of the perceived risk faced by shareholders. Section 7 explores whether the growth in the size of insurance companies can explain the expunging of shareholder liability. In section 8, we test if the disappearance of shareholder liability was successfully managed. Section 9 is a brief conclusion.

2. Background, concepts and hypotheses

2.1 A brief history of shareholder liability

Until the Companies Act of 1862, the only way for an insurance company in the UK to have limited liability was to have been incorporated via a Royal Charter or an Act of Parliament. Two famous examples of companies incorporated by an Act of Parliament are the London Assurance and Royal Exchange Assurance, which were a late addition to the Bubble Act of 1720. Because companies with tradeable shares were illegal under the Bubble Act, other insurance businesses were formed as unincorporated companies, which were clever legal workarounds utilising trust law (Turner,

2018). These insurance companies contracted in their deeds of settlement (i.e., corporate constitutions) to create limited liability (Supple, 1970, p.118). The UK's Courts of Chancery upheld the limited liability clauses in these deeds of settlement (Hunt, 1936, p. 100; Cooke, 1951, pp. 167-8). However, under the common law, unincorporated companies were *de jure* and *de facto* unlimited (Macgillivray and Browne 1937, p.3). The implications of this for insurance companies was that shareholders could limit their liability inter se, but not to third parties such as policyholders (Harris 2000, p.143). Even investors recognised this state of affairs (Raynes 1948, p.211). With the passage of the 1862 Companies Act, insurance companies could remove legal uncertainty around their liability by simply registering under this legislation, which most of them did.

From a practical point of view, however, debates about the legality of limited liability clauses were immaterial because unincorporated insurance companies had such large amounts of uncalled capital, i.e., capital which could be called upon by directors at any time, or by policyholders and other creditors in the event of bankruptcy. For example, in 1865 the shares of the average insurance company in the UK had a nominal value of £79 with £16 paid up (Acheson et al., 2012). The remaining £63 (c.80 per cent of the nominal value) was the capital which could be called up from shareholders. This meant that liability was far from limited to what the shareholder invested, with the average insurance company having quintuple liability.

2.2 Charting the demise of shareholder liability

The extant literature does not provide us with a good understanding of when shareholder liability disappeared in the UK insurance industry and the extent to which it was used prior to its disappearance. To address this gap in our knowledge, we collected data on the ratio of uncalled

capital to paid-up capital (i.e., the multiple of paid-up capital that shareholders were liable for) for all British and Irish non-subsidiary insurance companies contained within the insurance section of the *Stock Exchange Yearbook*. This annual publication reports the capitalization history of every public company in the UK. Table 1 shows the number of insurance companies with shareholder liability as well as the amount of liability for a variety of years between 1880 and 2020.

<<INSERT TABLE 1 HERE>>

There are several things worthy of comment in Table 1. First, there is a major decrease between 1900 and 1965 in the proportion of companies with shareholder liability. 92 per cent of companies had it in 1900, but this had fallen to 69 per cent in 1930, to 31 per cent of companies in 1960, and 16 per cent by 1965. According to later *Stock Exchange Yearbooks*, there were only eight companies with shareholder liability in 1968, and only one with shareholder liability in 1974. This remaining company was acquired by another company that year, with the result that there were no companies with shareholder liability in 1975.

Table 1 also shows that for those companies that did have shareholder liability, it reduced substantially between 1900 and 1930. The average company went from sextuple to quadruple liability and the median company went from quadruple to under double liability. Between 1900 and 1930, not only did the number of companies with shareholder liability fall substantially, but the liability provided by those that still possessed it fell substantially as well. Between 1930 and 1960, the mean and median shareholder liability fell even further.

2.3 Potential explanations for the demise of shareholder liability

Why would insurance companies have shareholder liability? According to Lekkerkerker and Peters (1995), shareholder capital in the insurance industry acts as a buffer, which is available to pay for

excess claims arising from disasters. This capital can be held by the insurance company and invested in low-risk assets. But this entails a high opportunity cost. An alternative is for shareholders to have a liability which is not limited, and which can be called up when claims are more than premiums. This type of capital can be used more productively by the shareholders than the insurance company.

As well as acting as a buffer, shareholder liability may act to constrain risk shifting. Risk shifting is a problem in banking because loan portfolios are opaque, so that depositors, at any given time, do not know the true value of a bank's assets (Bhattacharya et al., 1998). Shareholder liability can play a very important role in constraining bank managers from risk shifting at the expense of depositors because shareholders monitor and constrain managerial behaviour. Furthermore, managers are incentivized to act prudently because they also stand to lose personal wealth as owners. Similarly, in insurance firms, managers may take on too much risk unobserved by policyholders. For example, they can invest in overly risky assets which are not traded on public markets so that policyholders cannot easily assess the value of the insurance company's portfolio. This risk could result in large claims in the future which exceed the ability of the insurance company to meet them from its own resources. Shareholder liability can check this risk-shifting behaviour because shareholders monitor managers and managers have skin in the game as owners themselves. The presence of shareholder liability means that policyholders do not need to engage in very costly monitoring of insurance companies. They simply need to know that shareholder liability is present and credible.

So, what changed in the UK that encouraged insurance companies to expunge shareholder liability? In the banking sector, shareholder liability disappeared in the United States, Canada and the UK from the 1930s to 1950s (Wagster, 2007; Mitchener and Richardson, 2013; Turner, 2014).

In the case of the United States, Wilson and Kane (1996) connect the disappearance of double liability to the introduction of federal deposit insurance. Depositors and shareholders no longer required double liability when a safety net was introduced. In terms of insurance, it could be that something similar occurred in the UK, with a safety-net introduced which meant that shareholder liability was no longer required as a buffer. Another possibility is that the entry of regulations which constrained managerial behaviour meant that shareholder liability was no longer required to prevent managers risk shifting.

Another explanation for the disappearance of shareholder liability is that it was de facto pure limited liability. This could happen when shareholders are adversely selected, i.e., the only people who buy the shares are those whose wealth equals what they have invested in the insurance company's shares (Winton, 1993). Indeed, if a company was in financial distress, then a dynamic could quickly arise where all shares are transferred to impecunious individuals so that shareholders can evade calls on their wealth (Woodward, 1985). Such insinuations were made against U.S. banks with double liability (Vincens, 1957; Wilson and Kane, 1996), but this has been disputed by Macey and Miller (1992).

In the case of the UK, there were two things operating which may have prevented the shareholder liability of insurance companies becoming de facto limited. First, directors of companies with shareholder liability, because they were relatively large shareholders, had incentives to vet shareholders to ensure that they had sufficient wealth to cover potential capital calls (Hickson and Turner, 2003). This meant setting share denominations out of the reach of the less wealthy classes and rejecting any shareholder who was deemed to have inadequate wealth. Second, under the common law and under the 1862 Companies Act, shareholders were liable for

any liability for one year after selling their shares. This post-sale-extended liability requirement prevented shares being offloaded in times of financial distress.

Another potential explanation was that shares with shareholder liability were perceived as being riskier. If the company failed, shareholders could have lost not only their investment, but a sizeable additional amount. Such a possibility may have led investors to require a higher return, which would have implied a higher cost of capital for the firms. Insurance companies may therefore have wanted to phase out shareholder liability to reduce this cost.

However, customers would have seen shareholder liability as an extra source of stability which would ensure they could receive payouts even if the company failed. How did the insurance companies assure customers that they were safe, even if uncalled capital was removed? There may be a parallel in its disappearance from banking in the UK and Canada. Saunders and Wilson (1999) connect the reduction in capital and shareholder liability from the 1920s onwards to the consolidation of the UK and Canadian banking systems in the first two decades of the twentieth century. The growth in scale and scope made UK banks more diversified and therefore robust to shocks (Holmes and Green, 1986, p.119). Indeed, the consolidation of the UK and Canadian banking systems may have contributed to their stability during the Great Depression (Grossman, 1994).

The British insurance industry went through a substantial merger movement in the first two decades of the twentieth century (Pearson, 2013). It is notable from Table 1 that the number of insurance companies fell precipitously from 1900 to 1930. As Appendix Table 1 shows, UK insurance companies in this period also moved from being monoline to composite insurers. The consolidation of the insurance industry by pooling more risk made companies safer and less likely to experience shortfalls between premiums and payouts. Consequently, insurance companies were

able to expunge shareholder liability because they had become intrinsically safer and therefore less likely to call on buffers.

However, would larger companies not give more scope to risk shifting? If the growth in scale and scope was accompanied by greater investment in marketable assets, i.e., assets which were visible and easily priced by policyholders, then there would be reduced potential for risk shifting. Risk shifting can only occur when insurance companies hold unmarketable assets, such as mortgages and loans, in their asset portfolios. Notably, the consolidation of the insurance industry in the first two decades of the twentieth century was preceded by a movement of insurance companies out of unmarketable mortgages and loans and into blue-chip equities and corporate and government bonds (Bogle et al., 2022).

3. Data

Ideally, to show that shareholder liability was not de facto limited, we would want to measure the wealth of insurance company shareholders to see whether they had sufficient wealth to cover any potential calls. Fortunately, the archives of the North British and Mercantile Insurance Company (NBMIC) have been preserved by Aviva plc and contain unique data which enable us to test whether shareholder wealth was adequate to cover potential calls.

To determine if shareholder liability increased the cost of capital because investors perceived it to be risky, we use monthly insurance company stock prices and dividends from 1830 to 1929, collated from the *Course of the Exchange* (from 1830 to 1868), and the *Investor's Monthly Manual* (from 1869 to 1929). We start in 1830 because there were few insurance companies listed before this date and we finish in 1929 because, as shown in Table 1, shareholder liability was very much on the wane by this date. Monthly total returns are obtained by dividing the annual dividend

payment by 12 and adding this to each month's capital gain/loss. We use the *Register of Defunct Companies* (Knight, 1978) and the *London Gazette* and newspapers to calculate delisting returns for insurance companies which failed. This dataset contains 250 insurance firms and 70,668 firm-month observations. The dataset also contains information on the paid-up value, nominal value, and the uncalled capital of each stock. We use the monthly market-capitalization weighted UK share index of Campbell et al. (2021) to measure returns on the overall stock market.

To investigate whether the disappearance of shareholder liability was linked to the increasing size of insurance companies, we focus on the period 1900 to 1930 when, as seen from Table 1, there was a major reduction in the number of insurance companies and in shareholder liability. We collected surviving financial statements for all insurance companies listed in the *Stock Exchange Yearbooks* for the years 1900, 1911, 1923 and 1930. These years were chosen because the Board of Trade reports, which contain the financial statements for the life assurance industry, were not produced for a variety of years, including 1910 and 1920. We sourced the financial statements of all companies which did not offer life assurance from the archives of company accounts at the Guildhall Library in London. Overall, our dataset contains 445 company-years and 230 unique companies. The *Stock Exchange Yearbooks* and Cockerell and Green (1994) supplemented the dataset used for this analysis by providing data on company age, type of insurance offered by companies, and their capital histories.

We are also concerned with whether size is a good predictor of the disappearance or shareholder liability, and if mergers, the main way by which insurance companies increased in size, also reduced the need for shareholder liability by making insurance companies better diversified. We use the monthly stock price dataset outlined above to address these questions.

To investigate the events that resulted in companies removing their shareholder liability and to understand the role of mergers in this process, we use the company capital histories reported in various *Stock Exchange Yearbooks*. This is supplemented by information in the *Register of Defunct Companies* and *Financial Times* where necessary.

4. Regulation and government safety nets

Shareholder liability provided policyholders with a large degree of assurance that their claims would be met even if the insurance company was to fail. It also provided them with assurance that the managers of the insurance company would not take excessive risk which would jeopardise their ability to pay out on policies.

One possible explanation for the disappearance of shareholder liability is that the government provided a safety net which meant that policyholders no longer required shareholder liability. The first piece of legislation in the UK which provided policyholder protection was the Policyholders Protection Act which was passed in 1975. This Act required insurance companies to pay levies to fund a government guarantee, which would pay 90 per cent of the value of a policy should a company be liquidated and unable to pay out on an insurance policy.

The key thing to note about this Act is that the timing is wrong if we want to attribute the disappearance of shareholder liability to its passage. Most companies had expunged their shareholder liability two decades or more before this Act was passed. Indeed, it would be something of a stretch to say that the Act had been anticipated because it was only telegraphed in 1974 by the government. Notably, the demise of shareholder liability is not mentioned in the various parliamentary debates surrounding its introduction. Indeed, it had been the failure of an

insurance company in 1974 which precipitated the introduction of the Policyholders Protection Act (Hodgin, 1986).

Another possible explanation as to why shareholder liability disappeared is that the government introduced regulation which meant that adequate capital buffers were maintained and that managers were restrained from risk shifting. The genesis of insurance regulation in the UK was the Life Assurance Companies Act of 1870. This legislation made it more difficult for life assurance companies to give a false impression of the security of their business. It also enshrined 'freedom with publicity' as the philosophy of insurance regulation in the UK for the next century. The 1870 Act was extended to all general insurance companies by the Assurance Companies Act of 1909. The 1870 and 1909 Acts would have made it easier for policyholders to discern the true value of a company's assets. Risk shifting was thus made more difficult because assets were marketable and therefore easy to monitor and value. Undoubtedly, the disclosure required by these two Acts eventually helped facilitate companies on the journey towards expunging shareholder liability. However, the expunging of shareholder liability cannot be attributed to these Acts. To illustrate this point, one just needs to look at Appendix Table 1. From this table, we see that, 30 years after the passage of the 1870 Act, life assurance companies nearly all still had shareholder liability and had as much shareholder liability as other types of insurance company.

The next piece of legislation which directly affected insurance companies was the Assurance Companies Act of 1946.[1] This Act, as well as extending the 1909 Act to the small number of insurance companies that sat outside its ambit, introduced a minimum capital requirement of £50,000 for all new insurance companies and a minimum solvency margin. None

[1] The Insurance Companies Act, 1958 simply consolidated the 1946 and 1909 Acts into one piece of legislation.

of these changes would have directly affected most incumbent insurance companies in terms of the amount of shareholder liability they possessed.

The next two pieces of legislation happened well after the majority of companies had expunged their shareholder liability. The Companies Act of 1967 increased the minimum capital requirement for new companies and introduced a sliding scale for determining solvency margins so that insurance companies could be wound up while they still had funds to distribute. The Insurance Companies (Amendment) Act of 1973 ended the 'freedom with publicity' philosophy by giving the government surveillance and informal supervisory powers over insurance companies.[2]

The timing of the disappearance of shareholder liability does not coincide or come close to coinciding with the introduction of a policyholder safety net in 1974 and a supervisory regime in 1973. Of course, this begs the question as to whether the expunging of shareholder liability eventually resulted in the government having to do these things. Notably, there were some muted calls in 1973, in the light of insurance company failures, for shareholder liability to be reintroduced into insurance (*Financial Times*, 6 Feb. 1973, p.2). However, the Insurance Companies Act of 1981 stated that the Department of Trade and Industry would not authorize any new insurance company unless its issued share capital was fully paid. Shareholder liability had not demised because of government intervention, but legislative fiat ensured that it stayed dead and did not rear its head again.

[2] House of Commons Debate, 18 July 1975, vol 895 cc1941-2020.

5. Was shareholder liability de facto limited?

It could be argued that shareholder liability was already de facto limited if the investors who held the shares had low wealth and would have been unable to meet any calls. One way of trying to address explicitly this is to assess the wealth of shareholders to evaluate whether they could cover potential calls. Thankfully, the archival records of the North British Mercantile Insurance Company (NBMIC) help us do this.

The NBMIC was a large composite insurance company, and it was ranked the 5th largest insurance company and the 65th largest company in the UK by market capitalization in 1913. It had a similar number of shareholders in 1911 (c.5,000) to the average non-railway company in the top 300 largest companies (c.6,300) (Foreman-Peck and Hannah, 2012). From 1882 until the 1920s, the nominal value of NBMIC's shares was £25 and their paid-up value also remained constant at £6.25, meaning that its shareholders faced quadruple liability.

How representative is this company? We think that, if anything, the NBMIC would have been, on the face of it, much more likely to become de facto limited than its peers. It was a large and frequently traded low-denomination stock, which was actively traded on the London, Edinburgh, Glasgow and Liverpool stock exchanges.

The *Share Transfer Books* of the NBMIC in Aviva's archives contain a substantial amount of detail, including the seller's name and address and whether executors of wills were selling shares. The earliest surviving *Share Transfer Books* date from 1 November 1882. Aviva operates a 100-year policy to protect personal information, which meant that we were given access to these books through to 1920. Digitisation of the transfer books created a database of 33,850 individual transfers. We then utilise the fact that executors of wills were selling shares and went to the NBMIC's *Register of Shareholders* to obtain the shareholding of and further details about the

deceased shareholders. Using this information, we searched for the deceased shareholder's probate record on Ancestry.com to obtain the value of their probated estate. Probate estate values in this era underestimate wealth because before 1926 all settled land and property is excluded from estate values and before 1898 all land and property are excluded. In addition, there were ways of hiding wealth (Cummins, 2021).

Using this approach, we found the wealth of 562 deceased shareholders. Table 2 reports the probated wealth of these shareholders as well as the proportion of their wealth invested in NBMIC shares at time of death. It shows that the median deceased shareholder left £15,805, which is equivalent to circa £2m in 2022. Even the shareholder at the 25th percentile was very wealthy.

The median deceased shareholder held only 2.9 per cent of their wealth in NBMIC shares, and the shareholder at the 75th percentile only held 8.5 per cent. In other words, most shareholders had more than enough wealth to cover the potential maximum call of £18.75 for every share that they held. Only 37 or 6.6 per cent of deceased shareholders had inadequate probated wealth to cover their potential maximum call, with circa 40 per cent of those just falling short by a small amount. In reality, most of these 37 individuals probably had more than enough wealth to cover maximum calls because real estate was not included in most probate valuations.

The final thing to note from Table 2 is that the average and median wealth of deceased shareholders falls after 1900, which is consistent with share investment becoming more widespread among the middle classes (Acheson et al., 2021). However, after 1900, shareholders had a lower proportion of their wealth invested in NBMIC shares, which means that although shareholders were less wealthy, they had greater capacity to meet calls.

<<INSERT TABLE 2 HERE>>

Assuming that deceased shareholders had the same wealth profiles as living shareholders and that the NBMIC is representative, then our evidence suggests that shareholders were wealthy and had more than enough wealth to cover calls if their company suffered huge losses. This finding is consistent with the view that shareholder liability was not de facto limited and that there were restrictions operating which prevented an equilibrium of low-wealth shareholders emerging (Woodward, 1985; Winton, 1993).

6. Risk and the cost of capital

The above evidence suggests that shareholder liability was credible. Thus, if investors viewed shares with shareholder liability as being riskier than fully limited shares, we should expect them to have demanded a risk premium, resulting in a higher cost of capital for shares with shareholder liability. To determine whether this was the case, we analyze the returns on insurance shares with and without shareholder liability, and construct total returns indices from 1830 to 1929. As can be seen from Figure 1, stocks with shareholder lability had higher returns than those that did not. Notably, this difference only emerges after 1870, which suggests that shareholders viewed all insurance companies as having unlimited liability before this point, despite companies trying to contract out of this in their deeds of settlement.

<<INSERT FIGURE 1 HERE>>

Using monthly stock price data from January 1830 to December 1929, we carry out an analysis that splits insurance companies into two portfolios, rebalanced each December for the following year. One portfolio contains stocks with shareholder liability and the other contains stocks that have no shareholder liability. Monthly equally weighted and market-capitalization weighted total stock returns are then calculated for each portfolio. These returns are then adjusted

for risk by calculating the excess return of the portfolio over its expected return based on the portfolio's beta.

We also split the analysis into two subsamples - 1830 to 1869 and 1870 and 1929 - for two reasons. The first is that the underlying data sources change in 1869, and the number of insurance companies included in the analysis increases from 1870 as a result. The second reason is that before most insurance companies registered under the 1862 Companies Act, there was ambiguity as to whether they had unlimited liability in the eyes of the law. Thus, given that we want to see how shareholder liability in the form of uncalled capital affects returns, we need to look separately at the period after companies had come in under the 1862 Companies Act.

<<INSERT TABLE 3 HERE>>

From Table 3 we can see that across the whole sample, the portfolio with shareholder liability provides significantly higher risk-adjusted returns than the portfolio containing stocks without shareholder liability. This is regardless of whether the risk-adjusted returns were equally weighted or weighted by market capitalization. The raw returns are not statistically different between the two portfolios when they are equally weighted. Notably, when we look at the period after 1870, both raw and risk-adjusted returns are statistically and economically higher for the shareholder liability portfolios no matter how the returns are weighted. However, this is not the case for the pre-1870 period, which likely reflects the fact that shareholders had unlimited liability in the eyes of the common law.

As can be seen from Table 3, the portfolios with shareholder liability contained smaller companies, companies with higher betas and lower dividend yields. Because the low number of insurance companies makes double sorting problematic, we use Fama-MacBeth regressions, where we include shareholder liability as an explanatory variable.

For each month between January 1830 and December 1929, we run the following Fama-MacBeth regression:

$$R = \alpha_0 + \alpha_1 c_{,y-1} + \alpha_2 x_{y-1} + \ldots + \varepsilon_i \qquad (1)$$

where R_i represents the monthly return for stock i at month m in year y; c_{y-1} represents the measure of shareholder liability for stock i in year y-1; x_{y-1} represents control variables for stock characteristics (size, beta, value, liquidity, age and sector dummies) for stock i in year y-1. As with the portfolio analysis, factors are determined in December to set up the regressions for each month in the following year.

The dependent variable in the regressions is the monthly total returns. In the regression analysis, shareholder liability is measured in two ways – (1) the ratio of uncalled capital to total capital (*UncalledRatio),* and (2) a binary variable set equal to 1 if the stock had shareholder liability and 0 otherwise (*SLorNot*).

Size for each stock is measured by the log of market capitalization of the company (*LNMarketCap*). The beta for individual stocks is estimated using portfolios to reduce the errors-in-variable problem.[3] Value is measured using the dividend yield (*DivYield*). The (il)liquidity of a stock is proxied by the proportion of months in the prior year with zero capital gain (*LiquidityProp*). Age is measured as the log of the number of years that the respective insurance company has been active (*LNAge*). We also created a series of binary variables relating to the sector that insurance companies operated in, i.e., life only, fire only, marine only, and composite companies.

<<INSERT TABLE 4 HERE>>

[3] Four portfolios have been constructed and rebalanced each December based on market capitalization and dividend yield, with a beta calculated for each portfolio. A stock's beta is determined as the beta of the portfolio it was in for a given year.

As with our portfolio analysis, the results in Table 4 are presented for the whole sample period and the two subperiods. We can see from Table 4 that there is a significant and positive relationship between returns and both measures of shareholder liability across the whole sample. These findings suggest that investors received a small premium each month for holding shares with shareholder liability. Interestingly, there is no premium on stocks with shareholder liability in the pre-1870 period, which is consistent with Figure 1 and the results from the portfolio analysis. For the sake of robustness, we also ran the Fama-MacBeth regressions using annual returns. As can be seen in Appendix Table 2, our findings remain unchanged.

Overall, the results from the Fama-MacBeth regressions, suggest that insurance company stocks with shareholder liability achieved higher returns than insurance company stocks with no liability, reflecting the additional risk to investors of extended liability. From a company's perspective, this implied a higher cost of capital.

Qualitative evidence also suggests that as time progressed there was a growing consensus that insurance shares with shareholder liability were becoming unpopular with investors. For example, shareholder liability was described by the *Financial Times* in 1918 as a 'handicap' which put off many investors and limited the potential pool of investors to the wealthy.[4] The *Financial Times* again highlighted in 1935 that shareholder liability made insurance shares unattractive[5], and in 1937 that for a range of insurance companies their shares with shareholder liability were trading at higher yields than fully paid shares in the same firms.[6] The avoidance of extended liability was one of the selling points emphasized by new unit trusts which invested in insurance company

[4] *Financial Times*, 5 April 1918, p. 11.
[5] *Financial Times*, 17 June 1935, p. 12.
[6] *Financial Times*, 14 June 1937, Special Insurance Review, p. II.

shares.[7] They moved the risk attached with shareholder liability away from the individual investor, so that it would be absorbed by the trust.[8]

7. Firm size and shareholder liability

Given the additional risks to them, investors may have preferred the removal of shareholder liability, and companies may have viewed this as a way to reduce their cost of capital. Nevertheless, shareholder liability was there for a reason – to reassure policyholders that their policies would be honored. We now therefore explore the hypothesis that shareholder liability was able to be expunged because insurance companies increased in size. The first thing we do is examine the capital histories in the *Stock Exchange Yearbooks* to understand the events which coincided with the expunging of shareholder liability.

Table 5 reports the events which coincided with the expunging of shareholder liability. Three things are apparent from this table. First, 63 per cent of these events happened between 1900 and 1930.[9] Second, 66 per cent of the coinciding events were mergers, and between 1900 and 1930, 83 per cent of the events were mergers. Third, after 1930, those companies which expunged their shareholder liability either merged with another company or capitalized their accumulated reserves. Overall, the findings in Table 5 are consistent with our hypothesis that the disappearance of shareholder liability was a result of insurance companies becoming larger.

<<INSERT TABLE 5 HERE>>

[7] *Financial Times*, 10 October 1935, p. 6.
[8] *Financial Times*, 20 June 1938, Special Insurance Review, p. II.
[9] Also, new companies founded after 1900, largely eschewed shareholder liability from the outset. Of the 29 companies in Table 1 with shareholder liability in 1930, 17 were founded or became insurance companies after 1900.

To explore this potential relationship between size and shareholder liability, we focus on the period of intense merger activity between 1900 and 1930 and ask whether there was a relationship between firm size and shareholder liability, and between firm size and the operational risk of the insurance company. If size played a role in the demise of shareholder liability, we predict that larger firms would have less shareholder liability and can bear more operational risk because of pooling. Using the financial statement data described above, we regress firm size and other explanatory variables on the ratio of uncalled capital to total capital (*UncalledRatio*). We then regress firm size and other explanatory variables on two measures of operational risk, which are proxies for the insurance firm's ability to pool risk. The two measures are *LiabRatio* – the ratio of the company's paid-up capital to its policy liabilities, which measures how much of a company's paid-up capital covered its liabilities, and *PremiumsRatio,* the ratio of premiums to policy liabilities, which measures the extent to which the premiums received covered policy liabilities.

In our regressions, we include the proportion of assets held in unmarketable assets (mortgages and loans on policies) because, as explained above, this may be an important determinant of shareholder liability. In addition, we include controls for the type of insurance offered by the company, firm age, a binary variable for the small number of companies which still had unlimited liability, and a binary variable if a company had subsidiaries. Summary statistics relating to the measures of shareholder liability and the explanatory variables are shown in Table 6, and a correlation matrix is in Appendix Table 3.

<<INSERT TABLE 6 HERE >>

The summary statistics in Table 6 reveal that for the average firm, 61 per cent of total capital was uncalled and that 88 per cent of companies in the panel had shareholder liability. The liability ratio shows that paid-up capital for the median firm was 0.29 times policy liabilities, and

the premiums ratio shows that for the median firm that premiums were 0.46 times policy liabilities. As the *LiabRatio* and *PremiumsRatio* variables are highly skewed, they are winsorised at a one per cent level in the regressions.

The regression results in Table 7 reveal several interesting findings. First, larger insurance companies had less shareholder liability, which is consistent with the view that shareholder liability eventually disappeared because firms got larger. Second, larger firms had more operational risk, which is consistent with the idea that greater pooling means that large firms are able to bear greater operational risk. Third, the absence of a significant relationship between shareholder liability and holding unmarketable assets may simply reflect that the shift away from unmarketable assets had mostly been completed by 1911 (Bogle et al., 2022).

<<INSERT TABLE 7 HERE>>

Having established that there was a relationship between size and lower levels of shareholder liability, we now ask whether size was a good predictor of disappearing shareholder liability. To answer this, we draw on the method developed in Fama and French (2001). Using the December stock price for each year from 1869 to 1899 contained within the stock price database, we carry out an annual Fama-MacBeth regression, with the dependent variable in this regression being *UncalledRatio.* Three explanatory variables are included in the regression - market capitalization in millions, dividend yield, and a binary variable set equal to 1 if the insurance company was headquartered in London and 0 otherwise. The results from this regression are then used to predict what happens to the *UncalledRatio* after 1899. The progression of the actual *UncalledRatio* from 1899 to 1929 in Figure 2 suggests that size was a good predictor of disappearing shareholder liability.

<<INSERT FIGURE 2 HERE>>

Whilst we have focused so far on the effect that mergers had on shareholder liability from the perspective of insurance companies increasing in size, mergers can also reduce the need for shareholder liability by improving diversification because the merging firms' business models are less than perfectly correlated. To determine if this was the case, we look at the 14 insurance companies contained within the monthly stock price dataset that took over multiple other insurance firms in the period from 1900 to 1930. This corresponds to 64 individual insurance companies. The actual standard deviation of these 64 pre-merger companies was 5.8 per cent. However, if the companies had already merged into the 14 groups that they would eventually become part of, the average standard deviation would have been significantly lower, at 4.7 per cent. This suggests that mergers may not just have had an effect on shareholder liability by making insurance companies larger, but also making them more diversified.

8. Was the disappearance of liability managed successfully?

The reduction, and ultimate removal, of shareholder liability was a gradual process. The reduced liability may have been welcomed by shareholders from the perspective of reducing risk, but only if it did not deter customers who may have been concerned about the reduced ability to cover payouts.

As the vast majority of firms where shareholder liability was expunged coincided with mergers, it is difficult to disentangle the effect of the merger from the disappearance of shareholder liability. In addition, many firms which expunged their shareholder liability were taken over and so we have no price history after the event. However, there are occasions when firms reduced their some of their shareholder liability and did not subsequently disappear. One plausible reason why we think that this may not have mattered for shareholders is that the growth in firm size made

firms less risky and there was less need for shareholder liability. In addition, the growth in size meant that there were reserves which could be capitalized to counterbalance the reduction in shareholder liability.

To test for the possibility that reductions in liability did not matter for shareholders, we perform an event study on cases where shareholder liability was reduced. To run the analysis, the reduction in shareholder liability must also be accompanied by a stock price change. This is because a reduction in shareholder liability accompanied with no change in stock price would appear to create a large negative return. This large negative return would only be a mechanical change reflecting that the stock was illiquid. Our monthly stock price data indicates that there were 148 reductions in shareholder liability accompanied by a change in stock price between 1830 and 1929. An event study is carried out using the market model used by MacKinlay (1997), that is:

$$R_{it} = \alpha_i + \beta_i R_{mt} + \varepsilon_t, E(\varepsilon_{it} = 0),\ var(\varepsilon_{it} = \sigma_\varepsilon^2) \qquad (2)$$

where R_{it} and R_{mt} are the time t returns on insurance stock i and the market respectively, ε_{it} is the zero mean disturbance term. α_i , β_i and σ_ε^2 are the parameters of the market model; α_i and β_i are estimated as $\hat{\alpha}_i$ and $\hat{\beta}_i$. The market returns are proxied using the UK market index developed by Campbell et al (2021). The estimation window, used to estimate the α_i and β_i for each insurance company, runs from eighteen months prior to the respective event to six months prior to the respective event, with Dimson (1979) adjustments to allow for thin trading. 129 of the 148 events have sufficient data to estimate alphas and betas in the estimation window.

The event window runs from five months prior (t=-5) to the respective event to six months after it (t=6). The event window begins prior to the event itself (t=0) because although changes in shareholder liability occur at a certain point in time, the corresponding event that led to the reduction (e.g., capital call, capitalization of reserves, etc.) may have been announced prior to it

taking effect. In this window, the monthly returns are calculated for each company, and compared with the expected return based on the values calculated in the estimation period. From this, an abnormal return is calculated:

$$AR_{i\tau} = R_{i\tau} - \hat{a}_i - \hat{\beta}_i R_{m\tau} \quad (3)$$

where $AR_{i\tau}$ is the time τ abnormal return on insurance share i, $R_{i\tau}$ is the time τ actual return on insurance share i and $R_{m\tau}$ is the time τ market return. Cumulative abnormal returns (CARs) are then calculated for each company. In the event window, we focus on the events which are unique, i.e., there is not another reduction in shareholder liability for the same stock that occurs within the event's estimation or event window. Of the 129 events with sufficient data to calculate information in the estimation window and thus the event window, 78 of these events are unique. We split the 78 events into two groups - those with a low reduction in shareholder liability and those with a high reduction in shareholder liability. We split the events out to distinguish between reductions which may have been trivial and large reductions in shareholder liability. The dividing line between a low reduction and high reduction is 10 per cent, which is the 75th percentile reduction; 53 events have reductions below 10 per cent and 25 events have reductions above 10 per cent.

<<INSERT TABLE 8 HERE>>

Table 8 shows that there were no significantly abnormal negative returns at the point in time when the insurance company reduced its shareholder liability (t=0) nor in the months immediately before or after. This is regardless of there being a low or high reduction in shareholder liability. Whilst there are some abnormal returns after the event, these do not persist and appear unrelated to the actual event. Table 8 also reveals that the same was true of the cumulative average abnormal returns throughout the event study. As there is no persistent abnormal reaction before or

after the event happening, regardless of there being a low or high reduction in shareholder liability, the reduction of liability does not seem to have mattered to shareholders.

A solution to this conundrum is found in the methods used by these companies to reduce their shareholder liability. We have been able to obtain data on the methods behind 20 of the 25 high reductions in shareholder liability. The majority (75 per cent) of these 20 high reductions were because of a capital restructure or the capitalization of reserves. In contrast, a calling up of capital only occurred in the remaining 25 per cent of the high reductions. Therefore, reductions in shareholder liability were mainly carried out by using shareholder reserves that had been built up over time from retained earnings. In other words, from the point of view of shareholders not much had changed.

9. Conclusions

This paper has argued that shareholder liability disappeared from the UK insurance industry because it had led to a higher cost of capital. Firms were able to remove it because they had grown in scale and scope, which made them better able to pool policyholder risks. This meant that there was less need for shareholder liability as a buffer to shocks. In addition, the development of capital markets had meant that UK insurance companies were able to hold marketable assets which meant that companies were less able to risk shift. Regulation played no role in the demise of shareholder liability in British insurance

Our findings ultimately show that shareholder liability disappeared because it was no longer required because of the increased consolidation in the insurance industry. This contrasts with the conclusions of Wilson and Kane (1996) on the disappearance of shareholder liability from the U.S. banking system. They argue that banks lobbied for deposit insurance as a replacement for

double liability. In the UK, shareholder liability in insurance just withered on the vine because of the changing landscape of the industry.

Our results suggest that from the perspective of the shareholder, the change in shareholder liability was managed successfully over a sustained period of time. From a wider industry and societal perspective, however, it may have increased the likelihood of insurance companies failing. Indeed, the introduction of supervision in 1973 and a safety net in 1974 lends support to this view.

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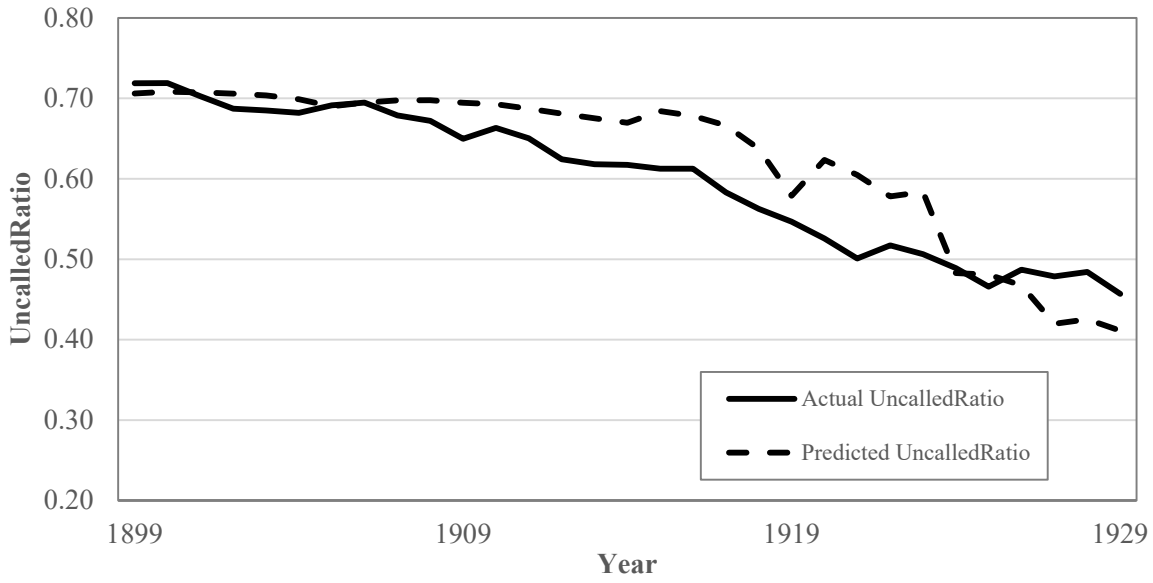
Figure 1: *Index of returns on insurance companies with and without shareholder liability, 1830 to 1929 (1869 = ln (100))*

Notes: This figure shows a log index (1869 = ln(100)) of average monthly total stock returns (weighted by market capitalization) for insurance companies with and without shareholder liability from 1830 to 1929. The data underlying these indices were obtained from the *Course of the Exchange* (1830 to 1868) and *Investor's Monthly Manual* (1869 to 1929).

Figure 2: *Progression of actual and predicted UncalledRatio, 1899 to 1929*



Notes: This figure shows the progress of the actual UncalledRatio of insurance companies included in the December editions of the *Investor's Monthly Manual* from 1899 to 1929. It is compared to the predicted UncalledRatio for these same insurance companies from 1899 to 1929, based on an annual Fama-MacBeth regression from 1869 to 1899, using data contained in the December editions of the *Investor's Monthly Manual* in those years. UncalledRatio is the dependent variable in these regressions, with Market Capitalization (in £ millions), the dividend yield, and a binary variable set to 1 if the insurance company was headquartered in London, 0 otherwise, included as dependent variables in the regression analysis.

Table 1: *Shareholder liability of UK insurance companies, 1880-2020*

Year	Number of companies		Uncalled capital/paid-up capital ratio					
	No Liability	Shareholder Liability	Mean (All Companies)	Mean	Std. Dev	Median	Min	Max
1880	7	118	5.8	6.2	5.8	4.1	0.2	39.0
1900	13	150	5.5	6.0	6.4	4.0	0.0*	46.8
1930	29	67	2.8	4.0	6.9	1.9	0.1	49.0
1960	50	23	0.8	2.6	3.8	1.4	0.2	19.0
1965	53	10	0.7	4.3	5.3	3.0	0.3	19.0
1975	34	0	0.0	-	-	-	-	-
2000	31	0	0.0	-	-	-	-	-
2022	18	0	0.0	-	-	-	-	-

Notes: Using information contained within the Insurance section of the *Stock Exchange Yearbook* (1880 to 1975) and *Datastream* (2000 and 2020), this table presents the number of British and Irish non-subsidiary insurance companies with shareholder liability between 1880 and 2020. Insurance companies with share capital that had no shareholder liability are categorised as no liability. The mean ratio of uncalled capital to paid-up capital across all insurance companies is presented (Mean (All Companies)). For those companies that had shareholder liability, summary statistics for the ratio of uncalled capital to paid-up capital are presented. * This is a non-zero value, 0.002.

Table 2. *Wealth of deceased NBMIC shareholders*

	Median	25th percentile	75th percentile	Average	Min	Max
Panel A: % of wealth in NBMIC shares at time of death						
1884-1900	3.3%	0.9%	10.1%	7.9%	0.00%	96.95%
1901-1920	2.9%	1.2%	8.2%	7.1%	0.02%	91.30%
1884-1920	2.9%	1.1%	8.5%	7.4%	0.00%	96.95%
Panel B: Probated wealth of deceased NBMIC shareholders (£)						
1884-1900	18,510	7,327	65,246	91,833	105	3,544,978
1901-1920	13,890	4,296	38,917	59,218	92	2,079,611
1884-1920	15,805	5,136	49,935	70,709	92	3,544,978

Notes: Using the North British and Mercantile Insurance Company's (NBMIC) records, we found the names and addresses of deceased shareholders. Using Ancestry.com, we then searched for and found the probated wealth of 562 deceased shareholders. Panel A reports the descriptive statistics for the ratio of value of NBMIC shares at time of death to value of probated estate. This measures the ability of shareholders to cover the uncalled proportion of their shares. Panel B reports the descriptive statistics for the probated wealth of the 562 deceased shareholders. No adjustments are made for inflation given the near-zero environment in this era.

Table 3: *Average monthly performance of shareholder liability sorted portfolios, 1830 to 1929*

Time Period	1830 to 1929		1830 to 1869		1870 to 1929	
	Shareholder Liability	No Liability	Shareholder Liability	No Liability	Shareholder Liability	No Liability
Summary Statistics						
Average Shareholder Liability	0.82	0.00	0.84	0.00	0.80	0.00
Average Market Cap of Stocks (£)	837,007	1,143,729	334,432	717,473	1,174,873	1,430,287
Average Dividend Yield of Stocks	4.36%	4.69%	4.06%	4.56%	4.57%	4.78%
Minimum Number of Stocks	15	3	15	3	34	6
Maximum Number of Stocks	96	21	38	7	96	21
Beta (Market Cap Weighted Returns)	0.906	0.768	0.837	0.679	0.952	0.838
Beta (Equally Weighted Returns)	0.950	0.753	0.916	0.698	0.950	0.798
Market Cap Weighted Returns						
Average Monthly Returns	0.61%	0.46%	0.48%	0.42%	0.70%	0.50%
Standard Deviation	1.77%	2.15%	1.29%	2.43%	2.03%	1.95%
T value, Shareholder Liability > No Liability	1.833**		0.521		1.917**	
Average Risk Adj. Monthly Returns	-0.11%	-0.67%	-0.47%	-1.07%	0.10%	-0.41%
Standard Deviation	1.61%	2.20%	1.42%	2.56%	1.60%	1.83%
T value, Shareholder Liability > No Liability	7.061***		4.469***		5.624***	
Equally Weighted Returns						
Average Monthly Returns	0.61%	0.45%	0.36%	0.46%	0.77%	0.45%
Standard Deviation	4.13%	1.62%	6.11%	1.72%	1.84%	1.56%
T value, Shareholder Liability > No Liability	1.181		-0.339		3.609***	
Average Risk Adj. Monthly Returns	0.01%	-0.72%	-0.33%	-0.96%	0.17%	-0.56%
Standard Deviation	4.03%	1.73%	6.08%	1.90%	1.48%	1.52%
T value, Shareholder Liability > No Liability	5.777***		2.176**		9.261***	

Notes: This table presents the results and summary statistics of a portfolio analysis carried out on insurance company stocks with and without shareholder liability. Using monthly stock price data from January 1830 to December 1929, we sort the insurance companies into two portfolios, rebalanced each December for the following year. One portfolio contains stocks with shareholder liability and the other contains stocks that have no shareholder liability. Monthly equally weighted and market-capitalization weighted total stock returns are then calculated for each portfolio, with the averages of these presented in the table. These returns are then adjusted for risk by calculating the excess return of the portfolio over its expected return based on the portfolio's beta. To allow for the thin trading of insurance company stocks, the beta for each portfolio has been determined by allowing for a Dimson (1979) adjustment of two lags. Finally, a t-test is carried out on the average monthly total stock returns (non-risk-adjusted and risk-adjusted), to determine if the average monthly total stock returns of firms with shareholder liability was significantly greater than those without shareholder liability. The portfolio analysis is not only carried out across the whole sample, from 1830 to 1929, but also two subsamples - 1830 to 1869 and 1870 and 1929. Monthly stock price data from 1830 to 1868 was obtained from the *Course of the Exchange*, and monthly stock price data from 1869 to 1929 was obtained from the *Investor's Monthly Manual*. ***, **, and * indicate significance at the 1%, 5%, and 10% levels, respectively.

Table 4: *Fama-MacBeth regression results*

	(1)	(2)	(3)	(4)	(5)	(6)
	Whole Sample	1830 - 1869	1870 - 1929	Whole Sample	1830 - 1869	1870 - 1929
UncalledRatio	0.0018***	0.0008	0.0027***			
	(0.0006)	(0.0010)	(0.0006)			
SLorNot				0.0016***	0.0009	0.0022***
				(0.0005)	(0.0009)	(0.0005)
LNMarketCap	-0.0002	-0.0000	-0.0004	-0.0002	0.0000	-0.0004
	(0.0002)	(0.0005)	(0.0002)	(0.0002)	(0.0005)	(0.0003)
Beta	0.0028	0.0020	-0.0004	0.0024	0.0018	-0.0003
	(0.0024)	(0.0022)	(0.0035)	(0.0024)	(0.0022)	(0.0035)
DivYield	0.0004***	0.0007***	0.0001	0.0004***	0.0007***	0.0002
	(0.0001)	(0.0003)	(0.0002)	(0.00014)	(0.0003)	(0.0002)
LiquidityProp	-0.0016	-0.0019	-0.0018	-0.0016	-0.0018	-0.0018
	(0.0010)	(0.0018)	(0.0011)	(0.0010)	(0.0019)	(0.0011)
LNAge	0.00016	-0.0003	0.0005	0.0002	-0.0004	0.0006
	(0.0003)	(0.0005)	(0.0004)	(0.0003)	(0.0005)	(0.0004)
Life	-0.0002	0.0007	-0.0008	-0.0001	0.0007	-0.0007
	(0.0005)	(0.0009)	(0.0006)	(0.0005)	(0.0009)	(0.0006)
Fire	0.0005	0.0011	-0.0001	0.0005	0.0010	-0.0000
	(0.0007)	(0.0012)	(0.0009)	(0.0007)	(0.0011)	(0.0009)
Marine	-0.0001	0.0023	-0.0018*	-0.0002	0.0022	-0.0019*
	(0.0010)	(0.0018)	(0.0011)	(0.0010)	(0.0018)	(0.0011)
Constant	0.0032	0.0023	0.0087*	0.0031	0.0021	0.0082*
	(0.0041)	(0.0067)	(0.0048)	(0.0041)	(0.0067)	(0.0048)
Observations	70,668	14,843	55,825	70,668	14,843	55,825
R-squared	0.2534	0.3683	0.1743	0.2525	0.3673	0.1733
Adj R-squared	0.0722	0.0857	0.0604	0.0710	0.0840	0.0592
Number of groups	1,193	480	713	1,193	480	713

Notes: This table presents the results of monthly Fama-MacBeth regressions on monthly total stock returns from January 1830 to December 1929. The Fama–MacBeth regressions are carried out by regressing the monthly total stock returns (winsorised at a 1 per cent level to reduce the influence of any outliers) on individual stocks in year y on several explanatory variables for the same stock in year y-1. These variables are determined in the December of each year y-1 to set up the regressions for each month in the following year y. In the regression analysis, shareholder liability is measured using two measures – (1) the ratio of uncalled capital to total capital (UncalledRatio), and (2) a binary variable set equal to 1 if the stock had shareholder liability and 0 otherwise (SLorNot). Columns (1-3) presents the results using the UncalledRatio measure, and columns (4-6) present the results using the SLorNot measure. LNMarketCap is the natural log of the market capitalization of the stock. DivYield is the dividend yield of the stock and is a proxy for the stock's value. Beta represents the market risk of the stock, but is estimated using portfolios to minimise the errors-in-variable problem. LiquidityProp measures the (il)liquidity of the stock and is proxied by the proportion of months in the prior year with zero capital gain. LNAge is the natural log of the number of years that the company attached to the stock has been active. Life, Fire and Marine are binary variables set equal to 1 if the company was a life only, fire only, or marine only insurance company, comparing these insurance companies to composite insurance companies. Constant is the intercept of the regression. Columns (1) and (4) present the results across the whole sample, columns (2) and (5) present the results from 1830 to 1869, and columns (3) and (6) present the results from 1870 to 1929. Monthly stock price data from 1830 to 1868 was obtained from the *Course of the Exchange*, and monthly stock price data from 1869 to 1929 was obtained from the *Investor's Monthly Manual*. Data on the LNAge, Life, Fire and Marine variables was obtained from Cockerell and Green (1994), *Stock Exchange Yearbooks* and the contemporary financial press. ***, **, and * indicate significance at the 1%, 5%, and 10% levels, respectively.

Table 5: *Events coinciding with the expunging of shareholder liability, 1900 to 1974.*

Period/Reason	Call on capital	Cancelling of uncalled capital	Capitalization of reserves	Failure	Merger	Mutual	Voluntary Liquidation	Total
1900 - 1909	0	0	0	2	43	0	6	**51**
1910 - 1919	0	0	1	2	36	0	2	**41**
1920 - 1929	0	0	2	1	14	0	3	**20**
1930 - 1939	3	1	0	3	11	0	4	**22**
1940 - 1949	1	0	5	0	0	0	0	**6**
1950 - 1959	1	2	11	0	7	0	0	**21**
1960 - 1969	3	0	3	1	5	1	0	**13**
1970 - 1974	0	0	2	0	2	0	0	**4**
Total	8	3	24	9	118	1	15	178

Notes: This table reports the events that coincided with an insurance company expunging its shareholder liability by decade. These events have been identified from the capital histories contained within the 1900, 1930, 1960, 1965 and 1975 *Stock Exchange Yearbooks*. An explanation of what the events are is as follows. *Call on Capital*: the shareholder liability was expunged as a result of a call on the capital of shareholders; *Cancelling of uncalled capital*: the shareholder liability was expunged by cancelling the uncalled capital of the company, and nothing else happened; *Capitalization of reserves*: the shareholder liability was expunged by paying up the remaining uncalled capital from its reserves; *Failure:* the insurance company ceased to have shareholder liability because it failed, and was not taken over by another insurance company (this required extra analysis of the company in the *Register of Defunct Companies* and *Financial Times*); *Merger:* here, an insurance company with shareholder liability was taken over by another insurance company. As the shareholder liability now fell on the parent company, the shareholder liability with respect to the company itself was effectively expunged; *Mutual:* the shareholder liability was expunged as a result of the company being mutualised; *Voluntary Liquidation:* the shareholder liability was expunged as a result of the company being voluntarily liquidated and the capital returned to shareholders.

Table 6: *Summary statistics for variables used in the panel analysis*

	Mean	Std. Dev.	Minimum	Maximum	Number of Observations
UncalledRatio	0.61	0.31	0.00	0.98	445
LiabRatio	1.99	7.33	0.00	91.40	437
PremiumsRatio	1.87	5.26	0.00	65.09	437
Assets (£m)	5.02	16.00	0.00	240.95	445
LNAssets	13.40	2.17	7.69	19.30	445
Unmarketable	13.52%	17.98%	0.00%	89.39%	445
Limited	0.97	0.16	0.00	1.00	445
Age	44.17	41.68	1.00	220.00	445
Composite	0.54	0.50	0.00	1.00	445
Life	0.51	0.50	0.00	1.00	445
Subsid	0.25	0.43	0.00	1.00	445

Notes: This table presents summary statistics of the variables used in the panel analysis, the results of which are in Table 7. Data relating to these variables have been obtained the 1900, 1911, 1923 or 1930 *Stock Exchange Yearbooks*, from the Statements and Abstracts of Reports deposited with the Board of Trade, under the Life Assurance Companies Act 1870/Assurance Companies Act 1909 (for companies that offered life assurance), and from financial statements contained within the archives of company accounts deposited at the Guildhall Library (for companies that did not offer life assurance). The variables are defined as follows: *UncalledRatio:* the ratio of a company's uncalled capital to total capital; *LiabRatio:* the ratio of the company's paid-up capital to its policy liabilities; *PremiumsRatio:* the ratio of the company's premiums to its policy liabilities; *Assets:* assets held by the company, in millions; *LNAssets:* natural log of the company's assets; *Unmarketable:* proportion of the company's assets in mortgages and loans on policies; *Limited:* binary variable set equal to 1 if the company has limited liability, 0 otherwise; *Age:* age of the company, in years; *Composite:* binary variable set equal to 1 if the company was a composite, 0 otherwise; *Life:* binary variable set equal to 1 if the company offered life assurance, 0 otherwise; *Subsid:* binary variable set equal to 1 if the company had a subsidiary, 0 otherwise.

Table 7: *Results of panel regression – covariates of shareholder liability and operational risk*

	UncalledRatio	LiabRatio	PremiumsRatio
LNAssets	-0.043**	-0.786***	-0.397***
	(0.019)	(0.206)	(0.112)
Unmarketable	0.122	-0.189	0.995
	(0.121)	(0.722)	(0.792)
Limited	0.043	0.337	0.011
	(0.047)	(0.412)	(0.181)
Age	-0.002	-0.005	-0.004
	(0.002)	(0.006)	(0.004)
Composite	0.011	0.835	0.403
	(0.048)	(0.631)	(0.308)
Life	0.000	-0.659	-2.164***
	(0.060)	(0.483)	(0.439)
Subsid	-0.008	0.522	0.431
	(0.037)	(0.478)	(0.362)
Constant	1.192***	12.036***	7.807***
	(0.204)	(2.506)	(1.341)
Observations	445	437	437
Companies	230	226	226
R-squared	0.144	0.158	0.276

Notes: This table presents the results of a panel analysis testing the relationship between company size and shareholder liability. There are four sets of panel regressions, each having a different measure of shareholder liability or operational risk as the dependent variable. These are: UncalledRatio, LiabRatio, and PremiumsRatio. The variables are defined as follows: *UncalledRatio:* the ratio of a company's uncalled capital to total capital; *LiabRatio:* the ratio of the company's paid-up capital to its policy liabilities; *PremiumsRatio:* the ratio of the company's premiums to its policy liabilities; *Assets:* assets held by the company, in millions; *LNAssets:* natural log of the company's assets; *Unmarketable:* proportion of the company's assets in mortgages and loans on policies; *Limited:* binary variable set equal to 1 if the company has limited liability, 0 otherwise; *Age:* age of the company, in years; *Composite:* binary variable set equal to 1 if the company was a composite, 0 otherwise; *Life:* binary variable set equal to 1 if the company offered life assurance, 0 otherwise; *Subsid:* binary variable set equal to 1 if the company had a subsidiary, 0 otherwise. The LiabRatio and PremiumsRatio variables have been winsorised at a 1 per cent level. ***, **, and * indicate significance at the 1%, 5%, and 10% levels, respectively.

Table 8: *Results of event study analysis on reductions of shareholder liability*

Time t (months)	AAR	AAR - low	AAR - high	CAAR	CAAR - low	CAAR - high
-5	-0.0028	0.0051	-0.0194	-0.0028	0.0051	-0.0194
	(0.0144)	(0.0167)	(0.0281)	(0.0144)	(0.0167)	(0.0281)
-4	0.0044	-0.0005	0.0147	0.0016	0.0046	-0.0047
	(0.0121)	(0.0166)	(0.0142)	(0.0188)	(0.0255)	(0.0235)
-3	0.0109	0.0037	0.0264	0.0126	0.0083	0.0217
	(0.0090)	(0.0101)	(0.0184)	(0.0243)	(0.0335)	(0.0273)
-2	0.0338	0.0602	-0.0223	0.0463	0.0685	-0.0006
	(0.0458)	(0.0658)	(0.0296)	(0.0400)	(0.0550)	(0.0447)
-1	0.0183	-0.0050	0.0677	0.0647	0.0636	0.0671
	(0.0203)	(0.0146)	(0.0547)	(0.0426)	(0.0558)	(0.0626)
0	-0.0242	-0.0234	-0.0259	0.0405	0.0401	0.0412
	(0.0196)	(0.0221)	(0.0400)	(0.0454)	(0.0572)	(0.0749)
1	0.0223	0.0224	0.0221	0.0628	0.0626	0.0633
	(0.0169)	(0.0223)	(0.0241)	(0.0559)	(0.0700)	(0.0936)
2	0.0010	0.0032	-0.0036	0.0638	0.0658	0.0597
	(0.0081)	(0.0077)	(0.0195)	(0.0583)	(0.0719)	(0.1015)
3	0.0101	0.0138	0.0018	0.0805	0.0796	0.0823
	(0.0154)	(0.0192)	(0.0261)	(0.0632)	(0.0793)	(0.1051)
4	0.0123	0.0060	0.0262**	0.0927	0.0856	0.1085
	(0.0097)	(0.0130)	(0.0124)	(0.0641)	(0.0792)	(0.1104)
5	0.0225**	0.0081	0.0541*	0.1152*	0.0937	0.1626
	(0.0104)	(0.0086)	(0.0265)	(0.0689)	(0.0828)	(0.1262)
6	0.0085	-0.0036	0.0352	0.1237*	0.0901	0.1978
	(0.0160)	(0.0184)	(0.0314)	(0.0710)	(0.0814)	(0.1415)
Obs	78	53	25	78	53	25

Notes: This table presents the results of an event study analysis of 78 events whereby an insurance company reduced its proportion of shareholder liability, which is defined as an increase in the stock's par/nominal ratio, & an accompanying change in stock price. Using monthly stock price data from January 1830 to December 1929 (obtained from the *Course of the Exchange* and *Investor's Monthly Manual*), estimation and event windows were constructed for each event, in order to determine abnormal returns. The estimation window runs from t=-18 months to t=-7 months (t=0 referring to the time of the actual event), and the event window runs from t=-5 months to t=6 months. Average abnormal returns (AAR) and cumulative average abnormal returns (CAAR) are presented in this table. In addition to being presented across the whole sample, AARs and CAARs are presented for low and high reductions in shareholder liability, Low represents reductions in shareholder liability below the 75th percentile reduction (10 per cent), and High represents reductions above the 75th percentile reduction. There is one event that drops out of the analysis during the event window at t=3 (high).

***, **, and * indicate significance at the 1%, 5%, and 10% levels, respectively.

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APPENDIX

Appendix Table 1: *Shareholder liability of UK insurance companies, 1880-2020 – by type.*

		Number of companies		**Uncalled capital/paid-up capital ratio**					
		No Liability	Shareholder Liability	Mean (All Companies)	Mean	Std. Dev	Median	Min	Max
Composite	1880	1	25	8.7	9.0	6.0	9.0	1.0	24.0
	1900	2	23	5.4	5.8	4.9	4.0	0.3	19.0
	1930	14	47	1.9	2.4	3.0	1.7	0.1	19.0
	1960	36	18	0.9	2.6	4.3	1.0	0.2	19.0
	1965	43	7	0.7	4.8	6.4	3.0	0.3	19.0
	1975	25	0	0.0	-	-	-	-	-
	2000	25	0	0.0	-	-	-	-	-
	2020	11	0	0.0	-	-	-	-	-
Fire	1880	2	21	6.4	7.0	8.6	4.0	0.2	39.0
	1900	1	21	11.0	11.6	11.7	9.0	0.2	46.8
	1930	0	4	20.9	20.9	19.5	14.0	6.5	49.0
	1960	1	0	0.0	-	-	-	-	-
	1965	1	0	0.0	-	-	-	-	-
	1975	0	0	-	-	-	-	-	-
	2000	0	0	-	-	-	-	-	-
	2020	0	0	-	-	-	-	-	-
Life	1880	3	33	5.7	6.2	5.0	5.3	0.1	19.0
	1900	5	43	5.3	5.9	5.6	4.0	0.0	19.0
	1930	7	6	2.3	5.0	5.4	3.5	0.3	15.7
	1960	6	4	1.1	2.7	1.1	2.7	1.4	4.0
	1965	7	3	0.9	3.1	0.8	3.0	2.3	4.0
	1975	7	0	0.0	-	-	-	-	-
	2000	6	0	0.0	-	-	-	-	-
	2020	7	0	0.0	-	-	-	-	-
Marine	1880	0	20	4.3	4.3	2.7	4.0	1.0	9.0
	1900	1	17	4.6	4.9	2.5	4.0	0.7	9.0
	1930	2	2	0.4	0.7	0.9	0.7	0.1	1.4
	1960	1	0	0.0	-	-	-	-	-
	1965	0	0	-	-	-	-	-	-
	1975	0	0	-	-	-	-	-	-
	2000	0	0	-	-	-	-	-	-
	2020	0	0	-	-	-	-	-	-
Other	1880	1	19	3.4	3.6	3.2	2.3	0.2	10.4
	1900	4	46	3.6	3.9	3.2	3.2	0.2	10.0
	1930	6	8	2.7	4.7	4.5	3.2	0.4	11.5
	1960	6	1	0.1	1.0	-	1.0	1.0	1.0
	1965	2	0	0.0	-	-	-	-	-
	1975	2	0	0.0	-	-	-	-	-
	2000	0	0	-	-	-	-	-	-
	2020	0	0	-	-	-	-	-	-
Total	1880	7	118	5.8	6.2	5.8	4.1	0.2	39.0
	1900	13	150	5.5	6.0	6.4	4.0	0.0	46.8
	1930	29	67	2.8	4.0	6.9	1.9	0.1	49.0
	1960	50	23	0.8	2.6	3.8	1.4	0.2	19.0
	1965	53	10	0.7	4.3	5.3	3.0	0.3	19.0
	1975	34	0	0.0	-	-	-	-	-
	2000	31	0	0.0	-	-	-	-	-
	2020	18	0	0.0	-	-	-	-	-

Notes: Using information contained within the Insurance section of the *Stock Exchange Yearbook* (1880 to 1975) and *Datastream* (2000 and 2020) this table presents the number of British and Irish non-subsidiary insurance companies with shareholder liability between 1880 and 2020. Insurance companies with share capital that had no shareholder liability are categorised as no liability. Results in this table are presented across the insurance sector, as in Table 1, but also by type of insurance company. Composite refers to an insurance company that offered more than one type of insurance. Life, Fire and Marine refer to an insurance company that *only* offered life assurance, fire insurance or marine insurance respectively. Other refers to an insurance company that either only offered one type of insurance, but was it not life, fire or marine, or where the type of insurance offered was unclear.

Appendix Table 2: *Fama-MacBeth regression results – using annual stock price data*

	(1)	(2)	(3)	(4)	(5)	(6)
	Whole Sample	1830 - 1869	1870 - 1929	Whole Sample	1830 - 1869	1870 - 1929
UncalledRatio	0.0267***	0.0095	0.0365***			
	(0.0089)	(0.0137)	(0.0108)			
SLorNot				0.0220***	0.0086	0.0290***
				(0.0073)	(0.0118)	(0.0085)
LNMarketCap	-0.0031	0.0000	-0.0064	-0.0030	0.0003	-0.0064
	(0.0039)	(0.0069)	(0.0043)	(0.0038)	(0.0068)	(0.0042)
Beta	0.0271	0.0352	-0.0026	0.0253	0.0338	-0.0041
	(0.0332)	(0.0276)	(0.0598)	(0.0335)	(0.0281)	(0.0598)
DivYield	0.0041**	0.0076**	0.0014	0.0043**	0.0076**	0.0018
	(0.0019)	(0.0032)	(0.0029)	(0.0019)	(0.0032)	(0.0029)
LiquidityProp	-0.0109	0.0042	-0.0275*	-0.0110	0.0040	-0.0277*
	(0.0130)	(0.0238)	(0.0147)	(0.0133)	(0.0245)	(0.0146)
LNAge	0.0040	-0.0035	0.0083	0.0044	-0.0042	0.0093
	(0.0047)	(0.0073)	(0.0062)	(0.0046)	(0.0073)	(0.0061)
Life	-0.0056	-0.0007	-0.0060	-0.0041	0.0008	-0.0050
	(0.0082)	(0.0113)	(0.0106)	(0.0081)	(0.0109)	(0.0106)
Fire	0.0080	0.0122	0.0051	0.0085	0.0131	0.0053
	(0.0091)	(0.0171)	(0.0099)	(0.0087)	(0.0161)	(0.0098)
Marine	-0.0001	0.0118	-0.0079	-0.0000	0.0127	-0.0089
	(0.0110)	(0.0155)	(0.0160)	(0.0110)	(0.0155)	(0.0161)
Constant	0.0466	0.0020	0.1227	0.0438	0.0009	0.1189
	(0.0628)	(0.0910)	(0.0763)	(0.0618)	(0.0893)	(0.0755)
Observations	5,994	1,283	4,711	5,994	1,283	4,711
R-squared	0.3000	0.3996	0.2339	0.2988	0.3994	0.2319
Adj R-squared	0.1362	0.1486	0.1291	0.1350	0.1485	0.1269
Number of groups	100	40	60	100	40	60

Notes: This table presents the results of annual Fama-MacBeth regressions on annual total stock returns from 1830 to 1929. The Fama–MacBeth regressions are carried out by regressing the annual total returns (winsorised at a 1 per cent level to reduce the influence of any outliers) on individual stocks in year y on several explanatory variables for the same stock in year y − 1. These variables are determined in the December of each year y-1 to set up the regressions for the following year y. In the regression analysis, shareholder liability is measured using two measures – (1) the ratio of uncalled capital to total capital (UncalledRatio), and (2) a binary variable set equal to 1 if the stock had shareholder liability and 0 otherwise (SLorNot). Columns (1-3) presents the results using the UncalledRatio measure, and columns (4-6) present the results using the SLorNot measure. LNMarketCap is the natural log of the market capitalization of the stock. DivYield is the dividend yield of the stock and is a proxy for the stock's value. Beta represents the market risk of the stock, but is estimated using portfolios to minimise the errors-in-variable problem. LiquidityProp measures the (il)liquidity of the stock and is proxied by the proportion of months in the prior year with zero capital gain. LNAge is the natural log of the number of years that the company attached to the stock has been active. Life, Fire and Marine are binary variables set equal to 1 if the company was a life only, fire only, or marine only insurance company, comparing these insurance companies to composite insurance companies. Constant is the intercept of the regression. Columns (1) and (4) present the results across the whole sample, columns (2) and (5) present the results from 1830 to 1869, and columns (3) and (6) present the results from 1870 to 1929. Annual Stock price data from 1830 to 1868 was obtained from the *Course of the Exchange*, and annual stock price data from 1869 to 1929 was obtained from the *Investor's Monthly Manual*. Data on the LNAge, Life, Fire and Marine variables was obtained from Cockerell and Green (1994), *Stock Exchange Yearbooks* and the contemporary financial press. ***, **, and * indicate significance at the 1%, 5%, and 10% levels, respectively.

Appendix Table 3. *Correlation matrix of variables used in panel analysis*

	Uncalled Ratio	Liab Ratio	Premiums Ratio	LNAssets	Unmarket-able	Limited	Age	Composite	Life	Subsid
UncalledRatio	1.000									
LiabRatio	-0.098	1.000								
PremiumsRatio	-0.029	0.854	1.000							
LNAssets	-0.064	-0.297	-0.302	1.000						
Unmarketable	0.025	-0.146	-0.160	0.355	1.000					
Limited	-0.072	0.034	0.029	-0.081	-0.025	1.000				
Age	0.024	-0.192	-0.211	0.651	0.266	-0.076	1.000			
Composite	0.000	0.014	0.014	0.150	-0.070	0.071	0.022	1.000		
Life	-0.117	-0.221	-0.306	0.645	0.544	-0.053	0.410	0.079	1.000	
Subsid	-0.031	-0.067	-0.041	0.377	0.071	-0.064	0.281	0.268	0.233	1.000

Notes: This table presents the correlation coefficients between the variables used in the panel analysis, the results of which are presented in Table 7. The variables are defined as follows: *UncalledRatio:* the ratio of a company's uncalled capital to total capital; *LiabRatio:* the ratio of the company's paid-up capital to its policy liabilities; *PremiumsRatio:* the ratio of the company's premiums to its policy liabilities; *LNAssets:* natural log of the company's assets; *Unmarketable:* proportion of the company's assets in mortgages and loans on policies; *Limited:* binary variable set equal to 1 if the company has limited liability, 0 otherwise; *Age:* age of the company, in years; *Composite:* binary variable set equal to 1 if the company was a composite, 0 otherwise; *Life:* binary variable set equal to 1 if the company offered life assurance, 0 otherwise; *Subsid:* binary variable set equal to 1 if the company had a subsidiary, 0 otherwise.