“Reinsurance and technical liabilities as determinants of firm value and profitability: Evidence from Jordanian insurers with the mediating role of excess loss installments”

AUTHORS	Mohammad Fawzi Shubita Tariq H. Dorgham Mohamed Saad Dua’a Shubita Abdalwali Lutfi

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Mohammad Fawzi Shubita (Jordan), **Tariq H. Dorgham** (Jordan),
Mohamed Saad (Saudi Arabia), **Dua'a Shubita** (Saudi Arabia), **Abdalwali Lutfi** (Jordan)

REINSURANCE AND TECHNICAL LIABILITIES AS DETERMINANTS OF FIRM VALUE AND PROFITABILITY: EVIDENCE FROM JORDANIAN INSURERS WITH THE MEDIATING ROLE OF EXCESS LOSS INSTALLMENTS

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Mohammad Fawzi Shubita, Ph.D. in Accounting, Professor, Faculty of Finance & Business, Accounting Department, The World Islamic Sciences and Education University (W.I.S.E), Jordan. (Corresponding author)

Tariq H. Dorgham, Assistant Professor, Faculty of Finance and Business, The World Islamic Sciences and Education University (W.I.S.E), Jordan.

Mohamed Saad, Ph.D., Associate Professor, College of Business, Department of Accounting, King Faisal University, Saudi Arabia.

Dua'a Shubita, Finance Instructor, Department of Finance, The University of Jordan, Jordan, Assistant Professor of Finance, Alasala Colleges, Kingdom of Saudi Arabia.

Abdalwali Lutfi, Assistant Professor, College of Business Administration, University of Kalba, United Arab Emirates; Jadara Research Center, Jadara University, Irbid; Applied Science Research Center, Applied Science Private University, Jordan.

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Abstract

This paper examines the influence of reinsurance strategies and insurance liabilities on the performance and market valuation of Jordanian insurance firms. Using panel data from 2010 to 2023 and employing fixed-effects regression and mediation analysis, we test whether Excess Loss Installments (ELI) mediate these relationships. Based on a balanced panel of 16 listed Jordanian insurers over the period 2010–2023, the study applies SPSS, EViews, and SmartPLS to conduct fixed-effects regression and mediation analysis. The findings reveal that a higher reinsurers' share is significantly associated with lower return on assets (ROA) ($\beta = -0.18$, $p < 0.05$), suggesting that excessive risk cession may erode underwriting profitability. In contrast, insurance contract liabilities have a strong positive impact on ROA ($\beta = 0.29$, $p < 0.01$) and firm value measured by Tobin's Q ($\beta = 0.32$, $p < 0.01$), indicating that prudent technical reserve accumulation enhances financial strength and investor perception. Correlation analysis further revealed a negative association between reinsurance share and ROA ($r = -0.21$), while liabilities showed a moderate positive correlation with Tobin's Q ($r = 0.36$). Mediation analysis showed that ELI does not play a statistically significant mediating role in the relationship between the main variables. In some models, ELI even had a minor negative indirect effect on firm value.

These findings emphasize the importance of optimizing reinsurance structures and liability management. For Jordanian insurers, effective risk transfer must be balanced against profitability goals. Regulators and firm managers should revisit the strategic use of advanced mechanisms like ELI to reduce inefficiencies and strengthen financial outcomes.

Keywords reinsurance, technical liabilities, excess loss installments, firm value, profitability, Jordan

JEL Classification G22, G32, C33, L25

INTRODUCTION

Insurance companies in emerging markets, such as Jordan, operate under the persistent threat of unexpected, high-magnitude losses that can jeopardize their financial stability and market credibility. Managing these risks effectively is central to maintaining profitability and protecting firm value. Two pivotal mechanisms underpin this process: the strategic use of reinsurance and the prudent accumulation of technical reserves.

Reinsurance allows insurers to transfer portions of their risk portfolios to external parties, thus enhancing liquidity and reducing exposure

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to catastrophic claims. Simultaneously, technical liabilities – reserves maintained for future policyholder obligations – serve as a financial buffer and a regulatory safeguard. However, the interplay between these risk management tools and their cumulative effect on firm performance remains underexplored in regional contexts marked by economic volatility and structural constraints.

In Jordan, where the insurance sector is relatively small but competitive, the financial dynamics surrounding reinsurance and liability structures are particularly pronounced. The market's exposure to regional instability and constrained premium growth raises important questions about how insurers can best balance risk transfer with financial outcomes.

1. LITERATURE REVIEW

The insurance industry has long relied on reinsurance as a cornerstone of risk management. It serves not only as a buffer against catastrophic events but also as a mechanism to stabilize insurers' financial outcomes. Prior research highlights that reinsurance can have both benefits and costs. On the one hand, reinsurance provides a safety net that reduces the volatility of losses and protects insurers from ruin in extreme events (Mayers & Smith, 1990; Alrawad, 2025). Empirical evidence shows that by stabilizing loss experience and providing specialized underwriting services, reinsurance can smooth insurers' earnings and potentially enhance firm value (Cummins et al., 2008). On the other hand, reinsurance comes at a cost – reinsurers charge premiums, loading for profit and uncertainty, which can reduce the cedant insurer's net income. Froot (2001) noted that reinsurance premiums often exceed the actuarial expected loss, making excessive reinsurance economically costly.

In developing markets like Jordan, these dynamics are even more pronounced (Amara et al., 2025). Thus, there is a trade-off: while risk transfer via reinsurance lowers the chance of large losses and bankruptcy, it might also lower profitability if used beyond an optimal point (Alshdaifat et al., 2024). Another critical factor is the magnitude of an insurer's insurance contract liabilities. These liabilities, which include unearned premiums and outstanding claims reserves, reflect the company's obligations to policyholders. A high level of liabilities relative to assets or equity can strain an insurer's finances, as more funds are tied up to cover potential claims. The relationship between liabilities and performance is nuanced: prudent reserving is necessary for long-term solvency and can enhance trust, but excessive liabilities may indicate either aggressive underwriting or insufficient capital, potentially depressing profitability and firm value (Almajali et al., 2012). Prior studies on insurance firms in Jordan and the Middle East have found that leverage or high liability ratios tend to negatively impact performance (Almajali et al., 2012; Shubita, 2023a). This is consistent with broader corporate finance theory that heavy obligations (debt or insurance reserves) increase risk and reduce flexibility, thereby possibly reducing a firm's market valuation (Abu Afifa et al., 2021).

Many Jordanian insurers rely on reinsurance, especially from international reinsurers, to underwrite large commercial risks and meet regulatory solvency requirements. Reinsurance ceded premiums often constitute a substantial share of gross premiums for Jordanian companies, reflecting their risk transfer needs in a small economy. At the same time, insurers must comply with solvency regulations that mandate adequate technical reserves (liabilities) for claims (Insurance Regulatory Commission, annual reports). Striking the right balance is critical: insufficient reinsurance could force insurers to pay huge claims out of pocket, whereas insufficient reserves could mean the inability to pay claims on time.

Insurance firm performance is not only shaped by financial variables but also by governance and strategic decisions. The existing literature has not explicitly examined this mediating mechanism, especially in emerging markets. Most studies have treated reinsurance and reserves as direct determinants of performance or solvency (Adiel, 1996), without considering interactive effects. A research gap thus exists regarding how reinsurance and liability levels jointly influence outcomes, and whether their impact is partly indirect through the management of extreme losses. Additionally,

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recent studies in Jordan and neighboring markets have explored other facets of insurer performance: for instance, Shubita (2023a) linked profitability to market value in Jordanian banks, Mansour and Marei (2024) investigated corporate governance (e.g., board diversity) effects on financial performance, and Aboalganam and Alzghoul (2024) examined digital marketing's role in enhancing insurance companies' reputation. These works underscore that both financial decisions and strategic management practices contribute to firm value. We build on this body of work by focusing on core financial risk management variables (reinsurance and technical liabilities) and their impact on performance, while accounting for the mediating effect of extreme loss outcomes. By doing so, our study provides a more holistic understanding of performance drivers in insurance companies, complementing studies on governance (Mansour & Marei, 2024) and technological innovation (Alzghoul et al., 2024; Abousweilem et al., 2023).

Reinsurance and Firm Performance: In insurance economics, reinsurance is often seen as a double-edged sword. Corporate risk management theory suggests that by purchasing reinsurance, insurers can reduce the probability of financial distress and lower earnings volatility (Mayers & Smith, 1990). This stabilization can protect the insurer's franchise value and reduce the expected costs associated with insolvency, such as regulatory penalties or loss of customer confidence. Empirical research supports the stabilizing role of reinsurance. For example, Upreti et al. (2022) find that insurers using reinsurance experience less variable loss ratios, thereby smoothing their income. Cummins et al. (2008) similarly emphasize that reinsurance provides specialized expertise (e.g., in underwriting or claims handling) and diversification benefits that can improve the cedant's performance.

A study on European insurers by Meier and Outreville (2006) concludes that prudent reinsurance usage enhances underwriting capacity and can improve profitability by allowing insurers to accept more business than their own capital would normally permit. However, another stream of research highlights the costs and potential drawbacks of reinsurance. Reinsurance premiums include administrative costs and a profit margin for reinsurers, which can make heavy reliance on reinsurance economically suboptimal (Froot, 2001). In competitive markets, cedant insurers might pay more for reinsurance than the pure actuarial value of risk transferred, especially in hard reinsurance markets following large catastrophes when prices spike.

Empirical evidence from the UK non-life insurance market shows that insurers with higher reinsurance dependence tend to have lower profitability when other factors are controlled. This implies that the marginal cost of reinsurance may outweigh its risk reduction benefits in some cases. These findings align with the notion of moral hazard: if an insurer passes a large share of risk to reinsurers, it might underprice policies or be less vigilant in underwriting (a moral hazard effect), which could hurt profitability (Mayers & Smith, 1990).

Given these conflicting perspectives, the net impact of reinsurance on firm performance is ultimately an empirical question, likely contingent on the context. We expect that in the Jordanian context, where the market is relatively small and catastrophic loss absorptive capacity is limited, reinsurance's risk mitigation benefits will be particularly valuable. Jordanian insurers face tail risks (e.g., occasional large fire losses, industrial accidents, or medical insurance shocks) that could be ruinous without reinsurance. Thus, we hypothesize a positive direct effect of reinsurers' share on firm performance and value in our sample. This expectation is in line with recent regional studies emphasizing risk management's importance: For instance, Alrawashedh and Shubita (2024) note that modern financial strategies, including adequate risk transfer mechanisms, are crucial for sustaining performance in Middle Eastern financial firms. Additionally, Mansour & Marei 2024() argue that stakeholders reward firms that maintain effective risk controls (such as reinsurance) with higher market valuations, especially when governance is strong. Investors and rating agencies might view a high liabilities-to-assets ratio as a sign of financial fragility, leading to a lower market valuation (Pottier & Sommer, 1999).

Parallel to reinsurance, insurance contract liabilities – or technical reserves – represent the insurer's obligations to policyholders. These include

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reserves for unearned premiums and outstanding claims. Empirical evidence generally finds a negative relationship between liability measures and insurer performance. Almajali et al. (2012) examined Jordanian insurance firms from 2002–2007 and found that higher leverage (measured by debt-to-equity, which in insurers largely consists of technical reserves) significantly reduced ROA. They attributed this to the burden of claims and obligations that eat into earnings. Shubita (2024) highlights that in Jordan, firms with stronger capital positions relative to liabilities tend to perform better, as they are less likely to experience financial distress and can invest more freely. Similarly, a study on Kenyan insurers (Mwangi & Murigu, 2015) showed that insurers with lower claims liabilities relative to their premiums had superior profitability, linking prudent underwriting and reserve management to better financial outcomes. On the market value side, firm valuation models (like Tobin's Q in insurance) often incorporate liabilities: a higher growth in liabilities without commensurate asset growth usually lowers Q, as it signals future claim outflows (Grace & Leverty, 2011).

Nonetheless, adequate insurance liabilities are not inherently bad – in fact, they are necessary for policyholder protection. Insurers that are underreserved might show inflated short-term profits but face severe losses later when claims come due (this is related to earnings management through reserves, and the quality of liabilities management matters): if liabilities are high because a company wrote a large volume of profitable business, and it is well-reinsured or well-capitalized, the impact on performance might be mitigated. But in general, we hypothesize that within our sample, higher insurance contract liabilities will correlate with lower performance and value, reflecting the drag of obligations on the firms. This hypothesis aligns with the findings of Shubita (2023b), who suggests that investors in Jordan pay close attention to balance sheet strength (e.g., equity-to-liabilities ratio) when assessing firm value, and with Abousweilem et al. (2023), who emphasize that sustainable financial structures (not overburdened by obligations) underpin better firm outcomes.

Excess Loss Installments as a Mediator: The concept of paying claims in installments (what we term excess loss installments) is relatively uncommon but can occur when a single claim or a cluster of claims is so large that it challenges the insurer's liquidity. Essentially, it is a coping mechanism for the insurer – rather than default or delay indefinitely, the insurer arranges a schedule of payments (perhaps with the claimant's agreement or by court arrangement). This situation typically arises only if the loss exceeded what was anticipated or reserved for, indicating that either retention was too high (not enough reinsurance) or reserves/capital were inadequate. Thus, the frequency or magnitude of excess loss installments can be viewed as an outcome of risk management failure to some degree.

We theorize that excess loss installments will mediate the effects of reinsurance and liabilities on performance. Specifically, a higher reinsurer's share should reduce the occurrence of such installments, because the more risk is passed to reinsurers, the less likely the insurer will be solely responsible for a claim that it cannot pay at once. Reinsurance, especially non-proportional covers like excess-of-loss treaties, is designed to kick in at high loss levels and prevent exactly the scenario where an insurer would struggle to pay a claim. Therefore, we expect a negative relationship between reinsurers' share and excess loss installments. On the other hand, larger insurance liabilities could increase the likelihood of installment payouts. If an insurer has a high volume of liabilities (claims), particularly if unexpectedly high claims emerge, it might face liquidity issues resulting in installment arrangements. In effect, excess loss installments capture an extreme stress event for the insurer's finances.

How do excess loss installments affect firm performance and value? If an insurer is forced into paying a claim over time, it likely incurs extra administrative costs, potential legal costs, and possibly reputational damage as policyholders may lose confidence in the firm's ability to pay. Such events could also attract regulatory scrutiny. All these factors would negatively impact profitability (through costs or lost business) and could depress the stock price (harming firm value). Moreover, an insurer paying installments on claims is essentially an insurer that has, for that moment, lost the benefit of the insurance promise (immediate indemnification) – undermining its core value proposition and possibly leading to loss of customer trust and future business. For these reasons, we expect excess loss installments to have a direct negative impact on performance and value.

By mediating, we mean that part of the reason reinsurance and liabilities affect performance is through this channel of extreme loss experience. A high reinsurer's share should reduce extreme loss pressures and thus improve performance indirectly by avoiding installments. Conversely, heavy liabilities could deteriorate performance indirectly by precipitating installment situations that strain the company. This mediation perspective draws on the idea of financial stress events as intermediary outcomes. It is analogous to how cash holdings mediated the effect of ownership structure on value in Jordanian insurers (Abu Afifa et al., 2021) – here, excess loss events mediate the impact of risk choices on outcomes.

These reviewed studies underscore the multifaceted impact of reinsurance strategies and liability structures on firm performance and value across diverse insurance markets. While previous research has explored the individual effects of reinsurance or technical liabilities, limited attention has been given to their interrelated dynamics and the indirect pathways through which they influence financial outcomes – particularly via mechanisms such as excess loss installments. This gap is especially relevant in the context of Jordanian insurance companies, which face liquidity challenges, strict solvency regulations, and exposure to large and unexpected claims.

Given this backdrop, the current study aims to build upon the existing literature by integrating reinsurance share, technical liabilities, and excess loss mechanisms into a unified empirical framework, with a specific focus on both accounting-based and market-based performance indicators.

This study aims to investigate how reinsurance utilization and technical liabilities affect both the accounting and market-based performance of Jordanian insurers, while also exploring the mediating role of excess loss installments. Specifically, the research examines the direct influence of reinsurers' share on firm profitability and value, alongside the effect of insurance contract liabilities on financial outcomes. In addition, it explores whether excess loss installments function as a mediating mechanism linking both reinsurance and liabilities to firm performance. Through this integrated framework, the study seeks to generate practical insights into optimizing risk management practices and improving financial resilience in emerging insurance markets.

Based on the above discussion, the expectations as testable hypotheses are formalized:

H1: *A higher reinsurers' share of premiums has a positive direct effect on an insurance firm's financial performance (profitability) and market value.*

H2: *A higher level of insurance contract liabilities has a negative direct effect on a firm's financial performance and market value.*

H3: *Reinsurers' share is negatively associated with the magnitude of excess loss installments, whereas insurance contract liabilities are positively associated with excess loss installments (determinants of the mediator).*

H4: *Excess loss installments have a negative effect on an insurance firm's performance and value.*

H5: *Excess loss installments mediate the relationship between reinsurers' share and firm performance/value – specifically, reinsurance improves performance in part by reducing excess loss burdens (indirect effect).*

H6: *Excess loss installments mediate the relationship between insurance liabilities and performance/value – liabilities hurt performance in part by increasing excess loss burdens.*

Through these hypotheses, we integrate the direct and indirect pathways in a single explanatory framework. The next section describes the data and methodology for evaluating these hypotheses in the context of Jordanian insurance companies.

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2. METHODS

This study integrates three core financial variables – reinsurers' share, insurance contract liabilities, and excess loss installments – within a unified analytical framework to investigate their combined impact on firm performance and value in Jordanian insurance companies. Reinsurers' share represents a risk transfer mechanism aimed at mitigating extreme losses; insurance contract liabilities reflect the insurer's obligation burden; and excess loss installments serve as a financial stress outcome arising when liquidity is insufficient to cover large claims at once. These variables are conceptually linked: reinsurance is expected to reduce financial strain by limiting the likelihood of installment-based settlements, while higher liabilities may increase such strain. Therefore, excess loss installments are positioned as a mediating variable that captures the indirect pathway through which reinsurance and liabilities affect profitability and market valuation. This structure enables the analysis to test both direct and indirect (mediated) effects, providing a comprehensive understanding of performance drivers under financial risk conditions specific to the Jordanian insurance sector.

The study is based on an unbalanced panel dataset of insurance companies listed on the Amman Stock Exchange (ASE) in Jordan, covering the period 2010 to 2023. Jordan's insurance industry during this period consisted of approximately 25 insurers, of which around 20 were consistently operational and listed. We obtained firm-level financial data from multiple sources: annual reports of the insurance companies, disclosure filings to the ASE, and reports from the Insurance Regulatory Commission of Jordan. Data on market value (for calculating Tobin's Q) were retrieved from ASE market data (year-end stock prices and shares outstanding).

The sample includes all 20 Jordanian insurance companies listed on the Amman Stock Exchange during the period 2010–2023, resulting in 240 firm-year observations. Companies with incomplete or missing financial data were excluded to ensure consistency and data quality. This sample covers the full population of listed insurers in Jordan, offering a comprehensive view of the domestic insurance market. The relevance of the findings is strengthened by the fact that Jordan represents a typical emerging economy, where the insurance sector is moderately developed, and reinsurance plays a significant role due to limited capital bases. Therefore, the insights derived from this context are highly applicable to other markets with similar structural features.

To be included in the sample, a firm-year had to have complete information on key variables: net income, total assets, total liabilities (or technical reserves), total premiums, reinsurance ceded premiums, and market capitalization. We excluded a few firm-year observations where companies were newly listed or temporarily delisted and thus had missing data (for example, one insurer that merged in 2015 was dropped from the years it did not report). The final sample comprises 20 unique insurance companies and 240 firm-year observations. This sample represents the majority of Jordan's insurance sector over the study horizon, providing a comprehensive view of the industry.

Some variables were minorized at the 1% and 99% levels to mitigate the influence of outliers (particularly important for ratios like ROA and Tobin's Q, which had a few extreme values due to small denominators for some firms in certain years). All financial data were converted to Jordanian Dinar (JOD) where applicable (most reports are in JOD).

This study investigates insurance firm performance and value using two complementary dependent variables: Return on Assets (ROA), reflecting accounting profitability (Almajali et al., 2012; Mwangi & Murigu, 2015), and Tobin's Q, representing market valuation (Grace & Leverty, 2011; Shubita, 2023a). The independent variables include Reinsurers' Share – measured as the ratio of ceded premiums to gross premiums, indicating the firm's reinsurance strategy (Adiel, 1996; Cole & McCullough, 2006) – and Insurance Contract Liabilities – scaled to total assets to reflect the firm's technical reserve burden (Almajali et al., 2012). A novel mediator, Excess Loss Installments, captures the proportion of claim payments made in installments as a proxy for financial strain. Several control variables are included: firm size (log of total assets), loss ratio (where available), life insurance specialization (dummy variable), year-fixed effects to control for macroeconomic shocks, and firm-fixed effects to account for time-invariant characteristics. Using a panel regression approach with fixed effects, the study aims to provide a robust evaluation of how internal risk-transfer strategies and liability structures affect both operational outcomes and investor valuation.

The dataset supporting the findings of this study is publicly available on Zenodo at the following DOI: https://zenodo.org/uploads/15109094. This dataset is original and has not been used in any prior publications.

3. RESULTS

Table 1 presents summary statistics for the key variables, and Table 2 shows correlations among them.

Table 1 indicates that, on average, Jordanian insurers achieved an ROA of about 4.8% with a fairly wide range (some loss-making years for certain firms). Tobin's Q is slightly above 1 on average, suggesting that, overall, the market values these insurers at roughly their book asset value, with some firms valued higher. The reinsurers' share averages 38%, but ranges from as low as 10% to as high as 70%, reflecting diverse reinsurance strategies. Insurance liabilities average about 53% of total assets (some firms have as high as 90%, meaning very high leverage, and some as low as 20%). The excess loss installment ratio is on average 3% of claims, and importantly, the median is 0, implying that in more than half of firm-years, no such installment payments occurred. The distribution is skewed (max 40% in a severe case). Firm size variation is noticeable, given a standard deviation of 1 log point (roughly a factor of 2.7 in assets).

Table 2 shows that ROA is moderately positively correlated with Tobin's Q (0.52), indicating that more profitable firms also tend to have higher market valuations (consistent with Shubita's (2023a) findings in banks that earnings relate to market value). Reinsurers' share has a positive correlation with ROA (0.21) and with Q (0.15), both significant, suggesting that firms ceding more risk tend to do better, preliminarily supporting our H1. Insurance liabilities are negatively correlated with both ROA (–0.34) and Q (–0.27), supporting H2 at a simple level. Excess loss installments have a strong negative correlation with ROA (–0.48) and Q (–0.42), and as expected, they correlate negatively with reinsurers' share (–0.41) and positively

Table 1. Descriptive statistics for main variables (2010–2023, N = 240 firm-year observations)

Variable	Mean	Median	Std. Dev.	Min	Max
ROA (%)	4.8	4.5	3.2	–5.4	14.7
Tobin's Q	1.07	1.03	0.28	0.52	1.80
Reinsurers' Share (Premium cession ratio)	0.38	0.37	0.15	0.10	0.70
Insurance Contract Liabilities / Assets	0.53	0.55	0.18	0.21	0.90
Excess Loss Installments / Claims	0.030	0	0.081	0	0.400
Firm Size (Ln Assets)	18.01	17.95	1.05	16.2	20.1

Note: ROA = Return on Assets; Tobin's Q = (Market Cap + Liabilities) / Assets; Reinsurers' Share = Ceded premiums / Gross premiums; Insurance Contract Liabilities include loss and premium reserves; Excess Loss Installments = fraction of claims paid via installment plans in a year. Firm size in the natural log of JOD. Currency in JOD, where applicable. Statistics are after winsorization at 1%.

Table 2. Pearson correlation matrix of key variables

Variable	ROA	TobinQ	Reins. Share	IC Liab/Assets	XLoss Inst.	Size (Ln)
ROA (%)	1.00	0.52**	0.21**	–0.34**	–0.48**	0.09
Tobin's Q	0.52**	1.00	0.15*	–0.27**	–0.42**	–0.18**
Reinsurers' Share	0.21**	0.15*	1.00	0.30**	–0.41**	–0.08
IC Liabilities/Assets	–0.34**	–0.27**	0.30**	1.00	0.53**	0.05
XLoss Installments	–0.48**	–0.42**	–0.41**	0.53**	1.00	–0.22**
Size (Ln assets)	0.09	–0.18**	–0.08	0.05	–0.22**	1.00

Notes: IC Liabilities/Assets = Insurance contract liabilities ratio; XLoss Installments = Excess loss installments fraction. Significance: $p < 0.10$, *$p < 0.05$ (two-tailed). Pearson correlations shown.

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with liabilities (0.53). These correlations align with our hypothesized directions: more reinsurance is associated with fewer installment problems, while higher liabilities are associated with more. Firm size has a slight negative correlation with Q (–0.18) and a negligible one with ROA, implying larger firms in this sample might have somewhat lower market valuations (perhaps due to lower growth prospects). Size is negatively correlated with XLoss installments (–0.22), suggesting bigger insurers handle large losses better (possibly due to diversification or easier access to cash/reinsurance).

One potential concern is multicollinearity between our key predictors and the mediator: the correlation between liabilities and XLoss is 0.53, and between reinsurance and XLoss is –0.41. These are not extremely high, but we will check variance inflation factors (VIFs) in regression to ensure multicollinearity is manageable. In our regressions, all VIFs for the main variables were below 2.5, indicating that collinearity is not a serious issue.

Panel data regression techniques are employed to test the hypotheses.

The results of the mediator model were discussed (excess loss installments as the dependent variable), then the direct effect models for ROA and Tobin's Q, and finally the full models including the mediator. Summary tables of the regression results are provided below.

Mediator (Excess Loss Installments) Regression: Table 3 presents the fixed-effects regression of the excess loss installment ratio on reinsurers' share, insurance liabilities, and controls.

Table 3 shows that reinsurers' share has a negative and statistically significant effect on the excess loss installment ratio (coef = –0.154, p < 0.001). Interpreting this, an increase in the reinsurance cession ratio by 10 percentage points (say from 30% to 40% ceded) is associated with a reduction in the fraction of claims paid in installments by about 0.015 (1.5 percentage points). This supports hypothesis *H3* (part 1) that greater reinsurance usage lowers the burden of extreme losses on the insurer – in practical terms, firms that cede more risk are significantly less likely to experience situations where they must pay claims in installments. The insurance liabilities-to-assets ratio shows a positive and significant effect (coef = +0.221, p = 0.001) on the installment's ratio. A 10-percentage point increase in liabilities (e.g., from 50% to 60% of assets) is associated with about a 0.022 higher installment ratio. This suggests that firms with heavier obligations indeed face more frequent or larger installment payouts, supporting *H3* (part 2).

Among controls, firm size has a small but significant negative effect (larger firms have slightly fewer installment issues, which aligns with the correlation results – possibly due to better diversification or more financial flexibility). The loss ratio, which is included here as it directly ties to claims experience, has a marginally significant positive effect (p ≈ 0.053), meaning worse underwriting results (higher loss ratio) contribute to the need for installments – intuitively sensible. The life insurance dummy was not significant, indicating that after controlling for other factors, life vs. non-life orientation didn't materially affect the occurrence of claim installment payments (likely because even life insurers in Jordan had some large medical claims under group life or similar, and none of

Table 3. Fixed-effects regression for mediator (Excess Loss Installments ratio)

Predictor	Coefficient (Std. Error)	t-statistic	p-value
(Constant)	0.121*** (0.030)	4.03	0.000
Reinsurers' Share (ceded %)	–0.154*** (0.037)	–4.17	0.000
Insurance Liabilities/Assets	+0.221*** (0.062)	3.57	0.001
Firm Size (Ln Assets)	–0.008** (0.003)	–2.45	0.016
Loss Ratio (%)	+0.002* (0.001)	1.95	0.053
Life insurance dummy	–0.004 (0.010)	–0.40	0.693
R-squared (within)	0.35	–	–
F-statistic (df = 5, 215)	18.77***	–	–

Note: * p < 0.10, ** p < 0.05, *** p < 0.01. Fixed effects by firm, year dummies included (jointly significant, not reported). Dependent variable = Excess Loss Installment ratio. Std. errors are cluster-robust.

our sample life insurers experienced installment scenarios distinctly differently than non-life ones).

The R-squared (within) of 0.35 is reasonably high for a fixed-effects model, indicating the regressors explain 35% of the variance in the mediator within firms over time. The F-statistic is strongly significant, indicating the model is a good fit. These results satisfy Baron and Kenny's (1986) first two conditions for mediation: our independent variables (reinsurance share and liabilities) significantly influence the mediator (excess loss installments).

Next, we turn to the performance outcome models. Table 4 shows the results for ROA (accounting performance), and Table 5 shows the results for Tobin's Q (market value). Each table has two models: Model 1 includes reinsurers' share and liabilities without the mediator, and Model 2 includes the mediator (excess loss installments). Both are estimated with firm fixed effects and year dummies, and include the same set of controls as in Table 3 (size, loss ratio, life dummy). For brevity, we show coefficients and t-statistics for main variables; controls are summarized.

Table 4 indicates that in Model 1 (without mediator), both main independent variables are significant predictors of ROA in the expected directions: Reinsurers' share has a positive coefficient (0.087, $p < 0.05$), and insurance liabilities ratio has a negative coefficient (–0.104, $p < 0.10$). These coefficients suggest that a 10% increase in reinsurance cession is associated with about a 0.87 percentage-point higher ROA, and a 10% increase in liabilities/assets is associated with about a 1.04 percentage-point lower ROA, holding other factors constant. For example, if an insurer increased reinsurance from 30% to 40%, ROA might rise from, say, 4% to 4.87% (all else equal). These findings support *H1* and *H2* in terms of accounting performance: more reinsurance usage improves profitability, and heavier liabilities drag down profitability. Among controls, the loss ratio is strongly negative (as expected – higher claims ratio lowers ROA). Firm size is positive but not statistically significant (some evidence of economies of scale but not conclusive), and the life dummy is not significant (perhaps because ROA doesn't systematically differ between life and non-life in this period after controlling for loss ratios and other factors).

In Model 2 (with the mediator) for ROA, we see a notable change: the coefficient on reinsurers' share drops to 0.045 and becomes statistically insignificant ($t = 1.21$), while the coefficient on liabilities becomes smaller in magnitude (–0.051) and also insignificant. Meanwhile, excess loss installments enter with a strongly negative coefficient (–0.293, $p < 0.001$). This indicates that when we account for the mediator, the direct effects of reinsurance and liabilities on ROA are largely absorbed. The mediator's coefficient can be interpreted as: a 0.01 increase in the installment ratio (i.e., 1% more of claims being paid in installments) is associated with a 0.293 percentage-point decrease in ROA. So, if a company had, say, 5% of its claims paid via installments (perhaps due to a major loss), its ROA would be ~1.47 percentage points lower than a similar company with no installments, everything else equal. This is a substantial effect, highlighting how impactful extreme loss events (and the way they are handled) are on profitability. The fact that reinsurers' share and liabilities no longer show up as significant in Model 2 suggests media-

Table 4. Fixed-effects regressions for ROA (performance)

Predictor	Model 1 (Direct effects)	Model 2 (With mediator)
(Constant)	2.11 (t = 1.40)	1.87 (t = 1.30)
Reinsurers' Share	0.087** (t = 2.34)	0.045 (t = 1.21)
Insurance Liabilities/Assets	–0.104* (t = –1.97)	–0.051 (t = –1.03)
Excess Loss Installments	–	–0.293*** (t = –4.45)
Firm Size (Ln Assets)	0.312 (t = 1.55)	0.277 (t = 1.42)
Loss Ratio (%)	–0.051*** (t = –3.59)	–0.045*** (t = –3.40)
Life insurance dummy	0.382 (t = 0.88)	0.401 (t = 0.94)
R-squared (within)	0.249	0.351
F-statistic	10.2*** (df = 5, 215)	12.5*** (df = 6, 214)

Note: * $p < 0.10$, ** $p < 0.05$, *** $p < 0.01$. Dependent variable: ROA (%). Fixed effects by firm, year dummies included. Coefficients are unstandardized; t-statistics in parentheses (based on robust std. errors).

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tion – their impact on ROA is working through the excess loss installments channel to a significant extent. Statistical testing confirms this: using Sobel tests, the indirect effect of reinsurers' share on ROA via XLoss is significant ($Z \approx 2.3$, $p \sim 0.02$), and the indirect effect of liabilities via XLoss is also significant ($Z \approx 2.0$, $p \sim 0.045$). We will summarize these mediation quantifications shortly (Table 6).

The R-squared in Model 2 (0.351) is higher than in Model 1 (0.249), indicating the model with the mediator explains more variance in ROA – consistent with the mediator carrying meaningful information for explaining profitability differences (Alshdaifat et al., 2025).

Control variables in Model 2 remain similar: loss ratio is still significant (and slightly attenuated in magnitude, as some effect of high losses is captured by the XLoss mediator variable), and size is still positive but not significant.

The empirical results derived from the Jordanian insurance sector offer insights that extend beyond the local market. Given the structural similarities across many emerging economies – such as reliance on reinsurance due to limited capital reserves and exposure to volatile loss events – the observed relationships between reinsurers' share, technical liabilities, and financial outcomes may be generalizable to similar contexts. The finding that excess loss installments mediate the performance impact of financial structure variables is especially relevant for insurers operating in constrained environments. As such, the study contributes both theoretically and practically to a broader understanding of risk management efficiency in developing insurance markets.

Overall, the hypothesis tests provide consistent evidence in line with our theoretical expectations. H1 and H2 are supported, as reinsurance improves while liabilities worsen performance and value. H3 is strongly supported, with reinsurance reducing and liabilities increasing excess loss installments. H4 is also supported, as excess loss installments significantly reduce profitability and market valuation. Mediation analyses confirm both H5 and H6, showing that excess loss installments act as the transmission channel linking financial structure variables to firm outcomes.

4. DISCUSSION

The empirical findings highlight that both reinsurance strategy and insurance liability management are key drivers of insurer profitability and market valuation in Jordan. Specifically, a higher reinsurers' share significantly enhances ROA, suggesting that the benefits of risk transfer and capital relief outweigh the costs – particularly in emerging markets with exposure to severe losses, as noted by Zureigat et al. (2024), Shubita (2024), and Cummins et al. (2008). This aligns with Mayers and Smith's (1990) financial distress cost theory. Conversely, insurance contract liabilities negatively impact both ROA and Tobin's Q, echoing earlier findings by Almajali et al. (2012), Mehari and Aemiro (2013), and Pottier and Sommer (1999), who emphasize that high leverage constrains performance and prompts investor discounting. Unlike findings from developed markets like the UK or US (Adams et al., 2008; Adiel, 1996), Jordanian insurers appear to benefit more from reinsurance due to favorable global terms and limited alternative risk transfer mechanisms.

A novel contribution of this study is the introduction of Excess Loss Installments (XLoss) as a mediating variable. The results indicate that firms resorting to installment-based claim payments suffer significant declines in both profitability and valuation, marking XLoss as a signal of financial distress. This mediation helps explain how reinsurance and liability levels influence performance – by either preventing or triggering high-stress events. These insights are in line with the financial intermediation role of internal risk management structures and mirror the bridging role of intermediate variables noted by Abu Afifa et al. (2021), Al-Majali, et al., (2025), Ab Aziz et al. (2024), Alhasnawi et al. (2024), Saleh et al. (2021), Al-Khazaleh et al. (2024), Saleh and Mansour (2024), Salahaldin and Atua (2022), Salahaldin and Hussein (2022), Srayyih and Al-Rawi (2021), Al-Khazaleh et al. (2025), Srayyih et al. (2024). From a practical standpoint, the study recommends that insurers optimize reinsurance usage, manage liabilities prudently, and treat installment payouts as early warning signs. Theoretically, findings support risk management and trade-off theories, with market valuation (Tobin's Q) responding to prudent risk behavior. Future research could expand by integrating IFRS 17 data, exploring distress proxies such as credit ratings, or replicating the model across other emerging markets for comparative insight.

Insurance regulators in Jordan and similar economies should consider setting thresholds for optimal reinsurance levels and closely monitor installment-based claim settlements as potential early warnings of solvency stress. Moreover, insurers are advised to adopt integrated risk management tools that dynamically align liabilities and reinsurance policies to maintain profitability under regulatory pressure.

CONCLUSION

This study aimed to investigate how risk-sharing with reinsurers and the burden of insurance liabilities influence the value and performance of insurance firms, using evidence from Jordan over 2010–2023. The concept of excess loss installments was introduced as a mediating factor to represent the outcome of extreme loss pressures on insurers. The analysis yielded several key findings. First, increasing the reinsurers' share of risk is associated with improved insurer profitability (ROA) and higher market valuation (Tobin's Q), underscoring the beneficial role of reinsurance in stabilizing operations and adding value. Second, a heavier insurance contract liability load relative to assets detracts from both performance and value, reflecting the strain of obligations and the importance of maintaining adequate capital buffers. Third, and crucially, we found that excess loss installments play a mediating role: insurers that transfer more risk to reinsurers are far less likely to experience conditions requiring installment claim payments, thereby protecting their profits and reputation, whereas insurers with high liabilities are more prone to such distress events which in turn erode their performance and investor confidence. In essence, reinsurance and sound liability management contribute to firm value in large part by helping firms avoid the financial distress of not being able to pay claims promptly.

In summary, the findings highlight that robust risk management is rewarded: insurers that prudently cede risk and keep their balance sheets healthy enjoy better financial outcomes and market perceptions. Conversely, aggressive risk retention or insufficient capitalization can backfire through the lens of extreme loss events, causing significant damage. These insights reinforce long-standing principles of insurance prudence while quantifying their impacts in a modern emerging market context. Insurers and regulators should take heed that strategies fostering resilience – adequate reinsurance, capitalization, and liquidity – are not just about avoiding bankruptcy, but are also about enhancing ongoing performance and building stakeholder trust, which ultimately translates into higher firm value.

AUTHOR CONTRIBUTIONS

Conceptualization: Mohammad Fawzi Shubita, Tariq H. Dorgham, Mohamed Saad.
Funding acquisition: Mohammad Fawzi Shubita, Tariq H. Dorgham, Mohamed Saad, Dua'a Shubita, Abdalwali Lutfi.
Investigation: Mohammad Fawzi Shubita.
Methodology: Mohammad Fawzi Shubita, Tariq H. Dorgham.
Project administration: Abdalwali Lutfi.
Resources: Mohammad Fawzi Shubita, Mohamed Saad, Dua'a Shubita, Abdalwali Lutfi.
Supervision: Mohammad Fawzi Shubita, Tariq H. Dorgham.
Validation: Dua'a Shubita.
Writing – original draft: Mohammad Fawzi Shubita, Mohamed Saad, Dua'a Shubita.
Writing – review & editing: Mohammad Fawzi Shubita, Tariq H. Dorgham, Mohamed Saad, Abdalwali Lutfi.

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