

Financing Risk Transfer under Governance Problems: Mutual versus Stock Insurers

Christian Laux
University of Frankfurt

Alexander Muermann
Wirtschaftsuniversität Wien

1 Introduction

An insurance corporation “organizes” risk sharing between individuals

- Stock Insurer:
 - Separation of policyholders and owners
 - ⇒ Separation of rights to indemnity claims and rights to profits
 - Capital raised separately from selling policies
 - Risk transferred from policyholders to owners (capital market)

- Mutual Insurer:
 - Policyholders are also the owners
 - Capital raised jointly with policies
 - Risk sharing within the pool of policyholders

What is the difference between the two organizational forms?

- Differences in risk bearing: participating vs. non-participating contracts (Smith and Stutzer, 90, 95)
- Differences in governance: reducing the customer-owner conflict vs. reducing the owner-manager conflict (Mayers and Smith, 81; Doherty and Dionne, 93; Zanjani, 04)

This paper: Carve out differences in how separation vs. non-separation of owners and customers differentially impacts raising capital and selling policies in the presence of identical owner-manager conflict

Owner-manager conflict (agency cost)

- Management derives private benefit that is increasing in the resources under its control (Stein 97, Hellwig 00, 01)
- Management maximizes value of resources as long as under its control
- If owners decide to pay out funds, only a fraction is returned (expropriation, investment in negative NPV projects, hide capital)

Raising capital under governance problems

- Owners bear the agency cost and have to be compensated for them by customers
- Stock insurer: separation of owners and customers implies difficulty in raising capital
- Mutual insurer: customers internalize the agency cost since they are also owners
 - this comes at the cost of less diversified owners

2 Model

- **Agents**

- n policyholders: risk-averse, initial wealth w_0 , facing loss X_i iid
- Manager: risk-neutral, sells full coverage for premium (P for stock, P^m for mutual)
- Shareholders: risk-neutral, provide capital C

- **Total capital TC**

- For stock: $C + nP$
- For mutual: nP^m

- **Timing**

- Stage 1 (for a stock insurer): capital C is provided by shareholders
- Stage 2: manager sells full coverage policies to n policyholders, insurance premium P or P^m is paid
- Stage 3: losses are realized, x_i
 - * if the insurer is solvent, realized claims are paid, manager extracts fraction α of surplus and remainder is returned to owners
 - * if the insurer is insolvent, claims are paid pro rata: $\frac{x_i}{\sum x_i} \cdot TC$

- **Agency cost**

- $\alpha \left(TC - \sum_{i=1}^n X_i \right)^+ =$ Agency costs arising from the governance problem
- Governance problem and frictional cost of capital are the same for a stock insurer and a mutual insurer
- α measures the severity of governance problem
- If there is no agency cost, $\alpha = 0$, it is optimal to raise infinite capital under both corporate forms; there is no insolvency risk and stock insurer dominates mutual through improved risk sharing

3 Raising Capital and Corporate Form

Benchmark Case: Stock Insurer With Commitment

- If raising capital and selling policies occurs simultaneously then optimal capital C^* and premium P^* are determined by

$$(C^*, P^*) = \arg \max_{(C, P)} E [u (W_1^s (C, P))]$$

s.t. shareholders' participation constraint (PC)

$$(1 - \alpha) E \left[\left(C + nP - \sum_{i=1}^n X_i \right)^+ \right] \geq C \quad (\text{PC})$$

- P^* consists of a compensation for
 - Expected indemnity payment to policyholders
 - Agency costs

Stock Insurer Without Commitment

- If capital is raised in advance of selling policies then at stage 2, cost of capital αC is sunk
- Therefore shareholders are willing to accept lower premium compared to the one implied by the PC
- At stage 1, the premium P , satisfying the PC, must also be optimal for policyholders after capital has been raised
 - Incentive compatibility constraint (IC)
 - It must be optimal to pay voluntary loading which compensates shareholders for frictional cost of capital

- The optimal capital \underline{C} and premium \underline{P} are determined by

$$(\underline{C}, \underline{P}) = \arg \max_{(C, P)} E [u (W_1^s (C, P))]$$

s.t.

$$\underline{P} = \arg \max_P E [u (W_1^s (\underline{C}, P))] \quad (\text{IC})$$

and

$$(1 - \alpha) E \left[\left(C + nP - \sum_{i=1}^n X_i \right)^+ \right] \geq C \quad (\text{PC})$$

- Proposition: For $0 < \alpha < 1$

$$0 < \underline{C} < C^* \text{ and } 0 < \underline{P} < P^*$$

- For policyholders
 - Collectively, it may be optimal to increase capital and provide capital even at unfair terms
 - Since buying policies and buying stock is separated, it is optimal to free ride on the capital provided by others

Mutual

- Sales of policies and provision of capital are linked
- Those who benefit (policyholders) directly bear the agency costs (no free rider problem)
- Cost: less diversification of owners (surplus risk borne by policyholders)
- The optimal capital/premium P^{m*} is determined by

$$P^{m*} = \arg \max_{P^m} E [u (W_1^m (P^m))]$$

where

$$W_1^m (P^m) = \begin{cases} w_0 - P^m + (1 - \alpha) \frac{1}{n} (n P^m - \sum_{i=1}^n X_i) & \text{if solvent} \\ w_0 - P^m - X_1 + \frac{X_1}{\sum_{i=1}^n X_i} n P^m & \text{if insolvent} \end{cases}$$

4 Risk Sharing and Corporate Form

Surplus Risk

- If stock and mutual insurer are equally capitalized then stock insurer dominates the mutual insurer
- Stock insurer with commitment dominates mutual insurer

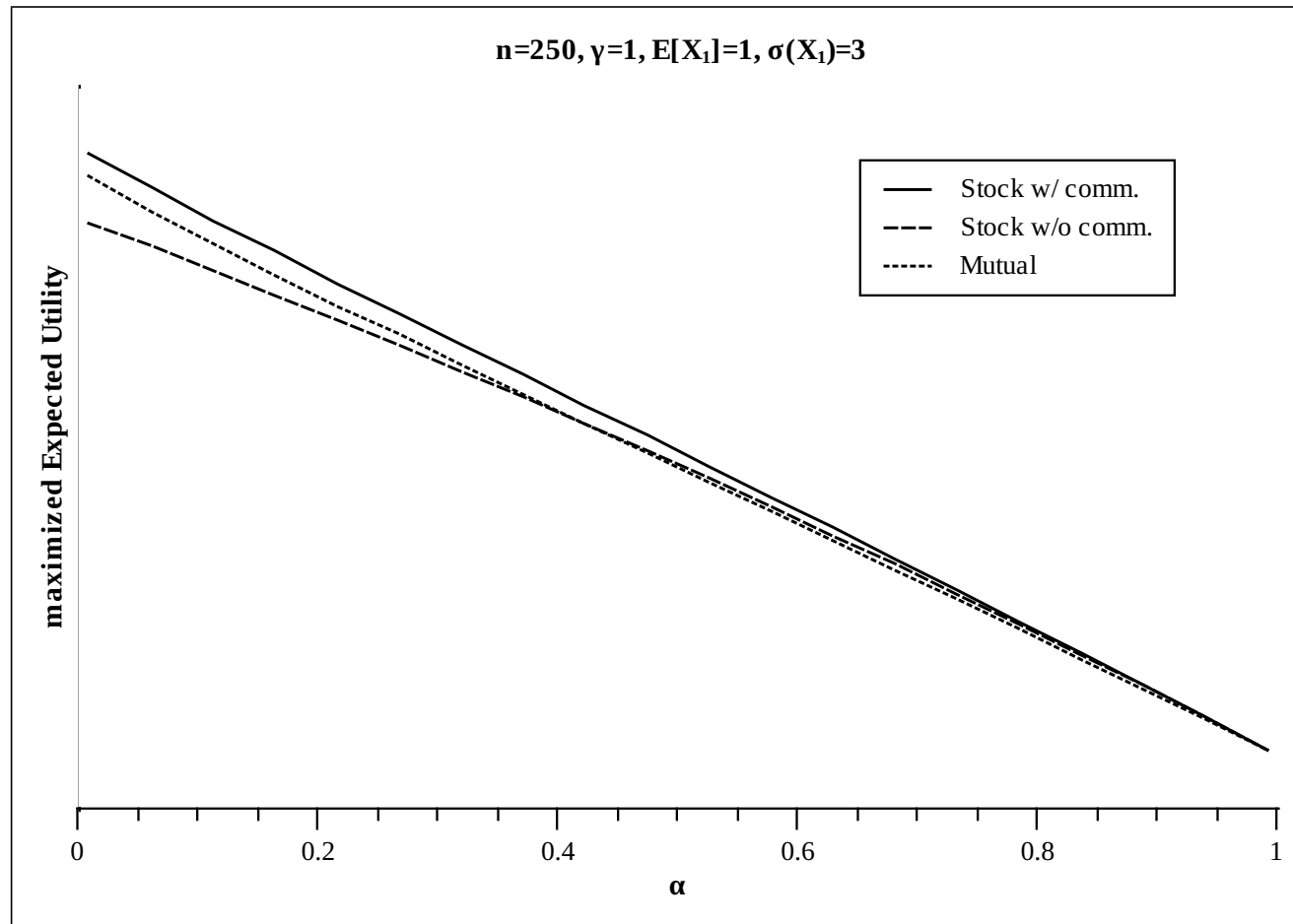
The Effect of Increasing Capital for a Mutual

- Reduction in probability of insolvency (benefit)
- Increase in agency cost in case of solvency (cost)
- Additional insurance in insolvency states (benefit)

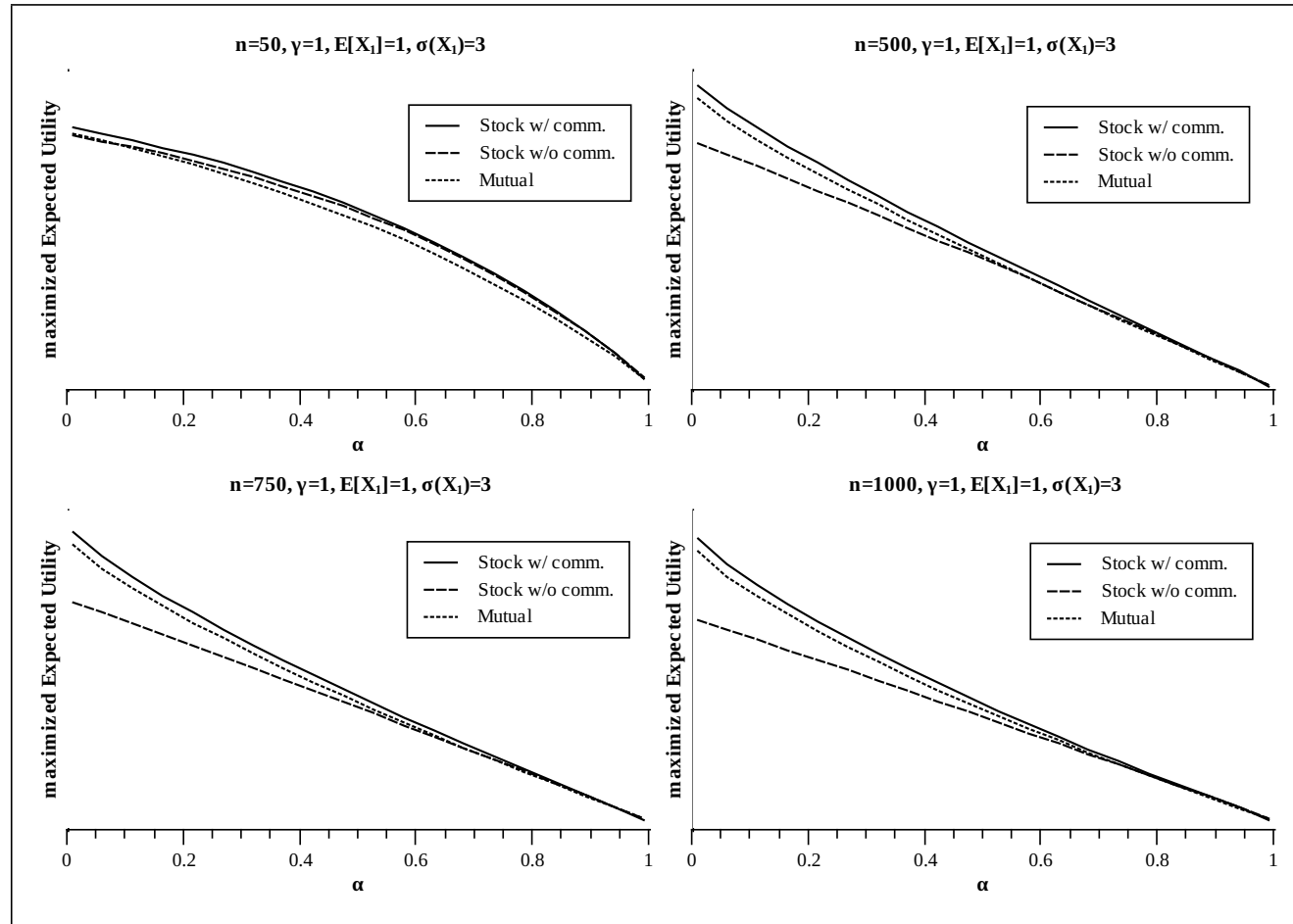
5 Numerical Comparison

- CARA preferences
- Gamma distributed claims X_i
- Solve each optimization program and plot maximized expected utility against the governance problem's intensity α

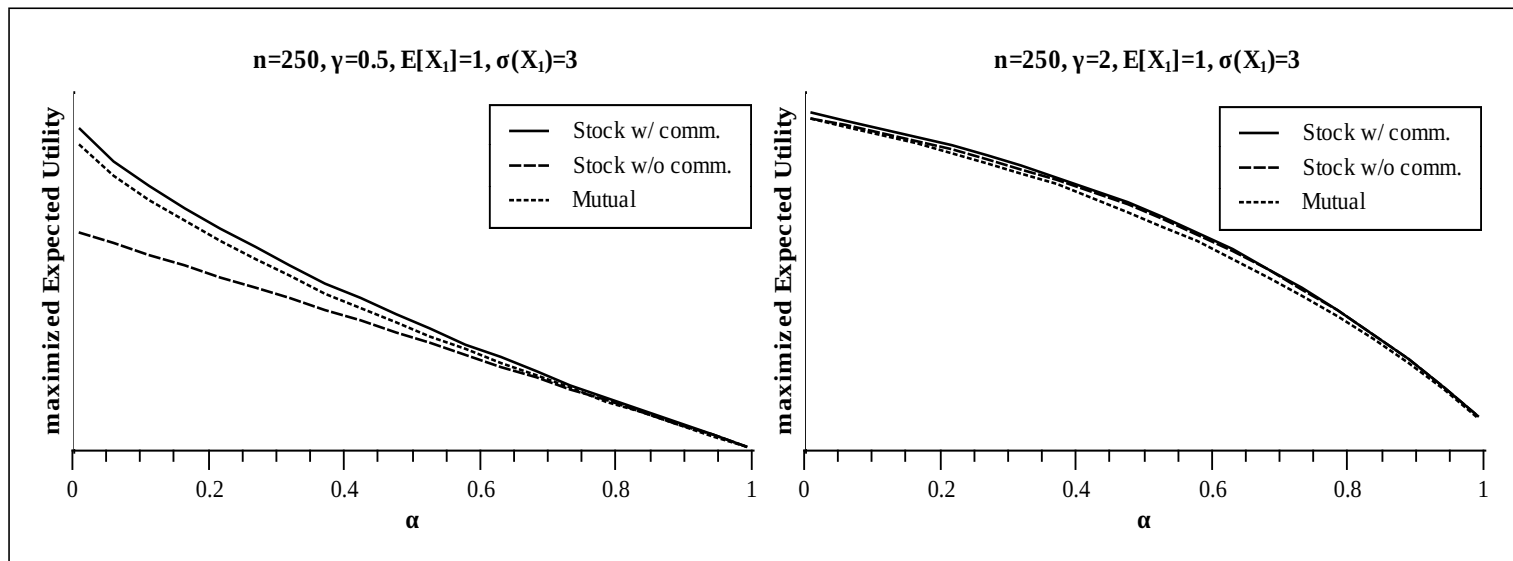
- Base case scenario



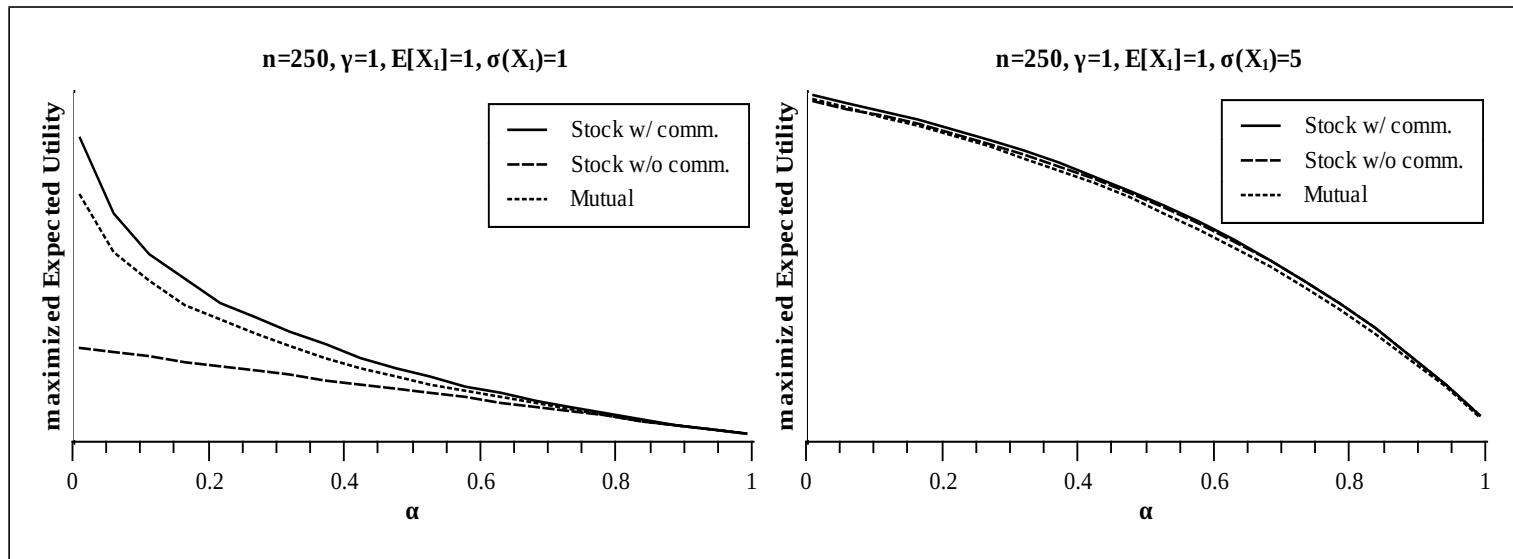
- Effect of changing number of policyholders, n



- Effect of changing coefficient of absolute risk aversion, γ



- Effect of changing standard deviation of loss distribution, $\sigma(X_1)$



Implication

- Stock insurer more likely to dominate mutual insurer when risk and thereby its sharing is more important
 - Lower diversification at the level of insurer, n
 - Higher degree of policyholders' risk aversion, γ
 - Higher standard deviation of losses, $\sigma(X_1)$

6 Extensions

- Improved governance of stock corporations may imply lower agency cost \implies additional advantage of stock insurer
- Higher correlation makes dominance of stock form more likely
- With multiple periods it is optimal to retain surplus in the company \implies benefit of stock insurer increases in the accumulated surplus

7 Empirical Predictions and Evidence

- The advantage of a mutual insurer arises when insurers have to raise large amounts of capital, e.g., after a large shock to capital due to catastrophic losses or financial crises
 - This is consistent with empirical evidence
 - * The New York Fire of 1835 wiped out most stock insurers and stimulated the formation of mutual insurers (Smith/Stutzer, 95)
 - * Mutuals were used more often in times of financial crises (Zanjani 04, 07)

- The benefit of a stock insurer arises in its ability to better spread risk when risk is high
 - This is consistent with empirical evidence that stock insurers are riskier than mutuals (Lamm-Tennant and Starks 93)

- The disadvantage of stock insurer decreases
 - If owner-manager conflict is higher for a mutual than for a stock insurer, e.g., through capital market regulation that increase shareholders' rights
 - If stock insurer accumulated capital after periods of low losses and high asset returns
 - This is consistent with observed demutualization in countries with highly developed stock markets (Viswanathan and Cummins, 03)
- Regulation aimed at increasing policyholders' rights may harm stock insurers more than mutual insurers
 - This is consistent with mutualization of three major stock life insurers in New York after the 1905 Armstrong Investigation (Fletcher, 66)

- Initial minimum capital requirement to form an insurance corporation may favor the formation of mutual insurers
 - The capital has to be raised before policies are sold
 - If the required capital is very high for a stock insurer, the commitment problem combined with the frictional cost of capital may be prohibitive

- Regulatory requirement of maintaining a minimum level of capital to support their insurance business might reduce the relative disadvantage of stock insurers
 - Selling policies first and then being forced to raise capital can reduce the problem that premiums may not cover the (sunk) frictional cost of capital if capital is raised first
 - Regulatory capital requirement may serve as a commitment device

8 Conclusion

- Distinction between mutual and stock insurers in organizing risk sharing under governance problem
- The insurance premium has to compensate shareholders for the expropriation of funds once the capital is provided
 - When insurance policies are sold, shareholders already have exposed their funds to be expropriated
 - The insurance premium may not provide a sufficiently high (quasi) rent to cover the agency cost
- A mutual internalizes the provision of capital and premium
 - Policyholders directly bear the cost of providing capital
 - They cannot free ride on others to provide capital at unfair terms