Testing for Information Asymmetries in UK Property-Liability Reinsurance

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Introduction

- We're looking for evidence of unanticipated ('residual') IA (i.e., AS & MH) in property-liability reinsurance contracts – where the cedant (primary insurer) has private information not available to reinsurers.

- Data by primary UK insurers' aggregate business lines, but not at contract-level (due to unavailability)

- We test for two types of evidence:
  (1) Residual IA: the link between reinsurance (Q) and gross claims (X) and
  (2) Contract design: the link between 'aggregate' reinsurance prices and (X).

- Exogeneity tests distinguish between AS & MH.

MOTIVATION

- IA has implications for pricing & capital allocation efficiency. Do pricing solutions work?
- GMM methodology distinguishes between AS & MH – a key advance.
- Wider appeal – e.g., managerial incentives.
- Reinsurance not confounded by regulatory effects to same degree as primary insurance markets.
- Separately tests for internal v. external reinsurance effects. Important & novel test of theory.

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Information Asymmetries in Reinsurance

- The problems of private information are common in all financial contracting settings (e.g., bank lending, managerial incentive design as well as insurance).
- AS: primary insurers likely to have higher gross claims (higher risk-types) buy more reinsurance (Rothschild & Stiglitz, 1976).
- MH: the existence of reinsurance cover increases gross claims, via poor underwriting &/or claims management (Doherty & Smetters, 2005).
- In AS: higher claims *cause* cover.
  In MH: cover *causes* higher claims.

What would we expect to see? (1)

- IAs are difficult to observe!
- We can't observe any monitoring by reinsurers/reinsurance brokers.
- We anticipate differences between external reinsurance and intra-group reinsurance (e.g. due to differing transaction costs). (Note: reinsurance is contingent-capital).
- In theory intra-group reinsurance should solve IA (e.g., because of risk sharing).
- We look for 'residual' IA and for evidence of contract design (loss-contingent pricing) solutions.

What would we expect to see? (2)

- We can separate group/non-group insurers.
- Evidence of 'residual' IA if primary insurers with higher gross claims have more reinsurance coverage. If claims are ***exogenous***, then this is AS; if they are ***endogenous*** then it is MH.
- We can observe solutions in the form of ***claims contingent*** prices i.e., reinsurance prices linked to present (e.g., due to audit-based pricing) or past claims (e.g., due to ex-post loss-sensitive pricing).

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Variable Definition

- (Annual/aggregate) Price = (outwards reinsurance earned premiums *less* reinsurance commissions received) / reinsured claims, if reinsured claims > 0.

- (Annual/aggregate) Quantity Q = reinsured incurred claims as % gross incurred claims.

Methodology (1)

- Data from UK's FSA returns, 1985-2003 on five 1-year business lines (motor, property, A&H, M&P, 3rd P): 55-124 primary insurers pa.
- Regression on panel-data, using GMM methods to instrument endogenous and pre-determined variables.
- 'Difference' and 'System' estimators [Arellano & Bond (1991), Blundell & Bond (1998)].
- 'Sargan-Difference' tests of exogeneity to distinguish AS & MH

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Methodology (2)

- Residual IA: the link between Q and gross claims X.
- Contract design: the link between 'aggregate' reinsurance prices and gross claims X.
- All models have dynamic specification to allow for auto-regressive behaviour.
- All models separate claims response between group and non-group.

Results (1): Summary

Evidence	Accident & Health	Misc. & Pecuniary	Motor	Property	Third Party Liability
Residual AS or MH?	None	MH in group companies	AS in group (and maybe non-group) companies	None	AS in group (and maybe non-group) companies
Claims-contingent pricing?	No	No	No	No	No
Reinsurance prices affect claims?	No	Yes in group companies	Yes in group companies	Yes in group (and maybe non-group) companies	Yes in non-group companies

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Results (2)

- Uncontrolled MH in Miscellaneous & Pecuniary reinsurance in groups – suggests need for better intra-group monitoring &/or penalties for poor control.
- Uncontrolled AS in motor and 3rdPL in groups – could indicate lax underwriting &/or other non-insurance factors at play (e.g., tax minimization).
- Reinsurance prices directly influence gross claims in all lines except A&H – may indicate loss recoupment/poor loss control by primary insurers.
- Group insurers have lower reinsurance prices than non-group insurers – may indicate over-reinsurance in groups which in turn induces IAs & impedes shareholder maximization objective.

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Results (3)

- Claims-contingent pricing not important for both group & non-group insurers – e.g., may reflect tax inefficiencies &/or uncertainty in determining quantum of claims.
- Particular IA problems in primary insurers belonging to conglomerate groups but not in external reinsurance arrangements (contrary to theory).
- May be the external reinsurance market is better at solving IA problems – e.g. role of brokers in mitigating IA.

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Conclusions

- Our study tests for AS & MH effects in the UK non-life reinsurance market using dynamic GMM methodology.
- A key finding is that group status matters but not in the way hypothesized – external market for reinsurance may be more efficient (brokers may play a useful IA mitigation role).
- Intra-group reinsurance needs to be more transparent (an accounting/regulatory issue).
- Implications of study extend beyond (re)insurance – e.g., capital allocation.

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