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Credible or Biased?

An Analysis of Insurance Product Ratings in Germany

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Agenda

1. Research Idea
2. Motivation
3. Background
4. Empirical Analysis
5. Conclusion

1. Research Idea



“Based on the unique case of the development of a market for insurance product ratings after deregulation in Germany, this study aims to evaluate the quality of the product rating market with a special focus on sources of potential bias in the ratings.”

Can we find bias for insurance product ratings?



Contribution to the literature...

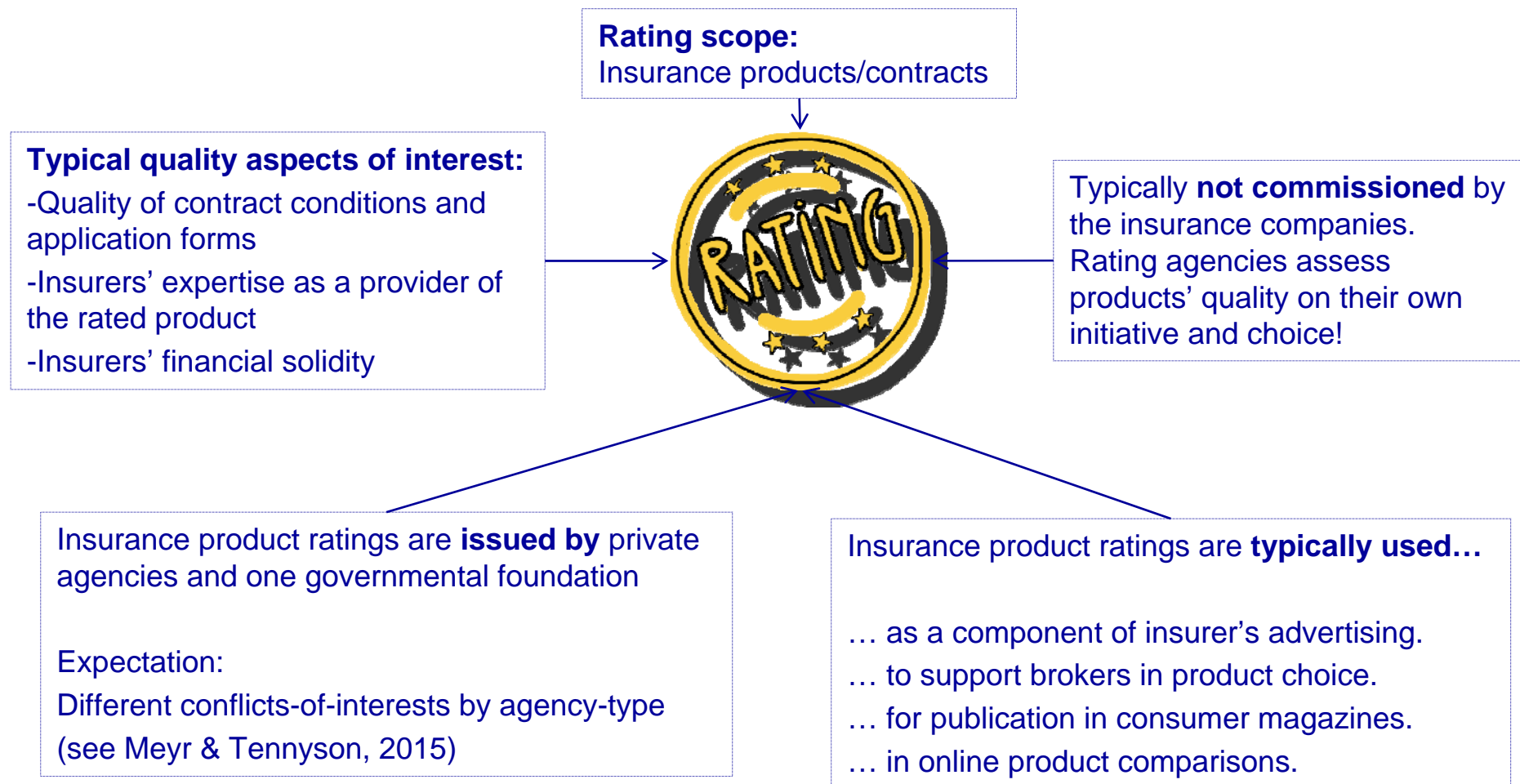
- ... on the validity of insurance product ratings
- ... on academic debate on insurance market deregulation

2. Motivation

- Insurance product ratings attach great importance on the German market. (Assekurata, 2006; Romeike, 2004)
- Ratings could only enhance market transparency if unbiased! (Dranove & Jin, 2010)
- Findings from other rating markets: financial incentives may lead to inflated ratings (e.g. Strier, 2008).
- Potential for rating bias differs with the characteristics of ratings and rating market frameworks (e.g. raters' income structure (Beaver et al., 2006; Covitz & Harrison, 2003) or ratings' commissioning (Bolton et al., 2012)).
- **Can we find bias for insurance product ratings?**



3. Background



4. Empirical Analysis – Data

Product Rating Data

- Data on occupational disability ratings of two agencies:
 - 4,244 obs. of ratings by Morgen & Morgen
 - 1,004 obs. of ratings by Finanztest
- Ratings on 873 products of 141 life insurance companies
- Period: 1999-2013

Industry Data: Life Insurance

- Data on financial and demographic characteristics of 141 German life insurance companies
- Data provider: Bisnode (balance sheet data sample)
- Period: 1999-2013

Combined data set: 4,185 unique product-year entities

4. Empirical Analysis – Overview

Insurer characteristics and
business relationship

- Hypotheses 1 to 3 -

Competition between
rating agencies

- Hypothesis 4 -



4. Empirical Analysis – Hypotheses 1 to 3

Insurer characteristics & business relationship

- Insurance product ratings are not required by law. \Rightarrow Rating agencies depend greatly on customers' and brokers' awareness.
- Larger companies are typically more familiar to customers and brokers and can therefore make a better contribution to increase the rating agencies' prominence.
- Does the incentive to attract larger companies lead to inflated ratings?

H1: Larger insurance companies receive higher ratings per product, all other factors held constant.

4. Empirical Analysis – Hypotheses 1 to 3

Insurer characteristics & business relationship

- Insurers providing a greater product variety might receive higher ratings as they will potentially buy a greater number of rating seals.
- Does the incentive to attract these companies lead to inflated ratings?

H2: Ratings per product increase with the number of products provided by an insurance company.

4. Empirical Analysis – Hypotheses 1 to 3

Insurer characteristics & business relationship

- Rating agencies might not want to endanger long-lasting business relationships with the rated insurers.
- Does the incentive to keep long-term business relationships lead to inflated ratings?

H3: ~~Ratings per product increase with the number of periods an insurer is~~
rated before the current rating by one agency.

4. Empirical Analysis – Hypotheses 1 to 3: Methodology

Insurer characteristics & business relationship

Ordered Probit Regression

- Dependent variable R_{it} : **rating category** per product and year with ordinal values from 1 (poor quality) to 5 (very good quality)
- μ_1 to μ_5 represent unknown thresholds for the observed rating categories
- X_{it} represents a vector of firm characteristics
- Clustered standard errors on the insurer-level

$$\Pr(R_{it} = j | \theta) = \begin{cases} \Pr(\beta_0 + \beta'X_{it} + \epsilon_{it} \geq \mu_4 | \theta) & \text{if } j = 5 \\ \Pr(\mu_j > \beta_0 + \beta'X_{it} + \epsilon_{it} \geq \mu_{j-1} | \theta) & \text{if } j = 4, 3, 2 \\ \Pr(\mu_1 > \beta_0 + \beta'X_{it} + \epsilon_{it} | \theta) & \text{if } j = 1. \end{cases}$$

4. Empirical Analysis – Hypotheses 1 to 3: Results

	Morgen & Morgen				Finanztest			
	Model IA:		Model IB:		Model IA:		Model IB:	
	coefficient	p-value	coefficient	p-value	coefficient	p-value	coefficient	p-value
Full sample	N = 3,225		N = 3,225		N = 766		N = 766	
Log net premium (H1)	0.237	0.007***	0.238	0.020**	0.328	0.000***	0.258	0.003***
Number of rated products (H2)	-0.068	0.025**	-0.050	0.094*	-0.044	0.297	-0.114	0.024**
Number of years rated in a row (H3)	0.001	0.968	-0.042	0.289	-0.098	0.020**	-0.024	0.687
Age of company	0.006	0.093*	0.008	0.066*	0.006	0.159	0.008	0.039**
Mutual company	0.145	0.751	0.095	0.853	-0.813	0.053*	-0.930	0.017**
Public organization	-1.135	0.000***	-0.846	0.018**	0.944	0.001***	0.677	0.027**
Establishment of foreign insurer	0.742	0.024**	0.762	0.037**	1.534	0.000***	0.598	0.139
Change in loss ratio	0.038	0.468	-0.023	0.749	0.374	0.022**	0.261	0.021**
Cancellation ratio	0.019	0.508	0.034	0.264	0.003	0.958	0.061	0.330
Average sum insured per contract	0.019	0.009**	0.019	0.036**	0.035	0.000***	0.024	0.004***
Year dummies	No		Yes		No		Yes	

*** Indicates the difference from zero is statistically significant at the 1% confidence level; ** 5% confidence level and *10% confidence level.

Notes: To test for robustness besides including year dummies we also changed the variable number of years rated in a row to a dummy on the long-term relationship (3 years and 5 years), which didn't significantly change our results.

4. Empirical Analysis – Hypothesis 4

Competition between rating agencies

- Rating agencies might have incentives to strategically react on competitors' ratings.
- Competitor downgrade \Rightarrow Incentive for own non-downgrade
- Competitor upgrade \Rightarrow Incentive for own upgrade

H4a: Downgrades for a particular product from agency A are followed by non-downgrades by agency B in the next rating period.

H4b: Upgrades for a particular product from agency A are followed by upgrades by agency B in the next rating period.

4. Empirical Analysis – Hypothesis 4: Methodology

Competition between rating agencies

Probit Regression

- “Granger-Causality-Test” as used in Beaver et al. (2006): Comparison of rating distributions by Morgen & Morgen and Finanztest to test whether ratings of one agency are likely to predict ratings of the other.
- Dependent variables: **rating up- and downgrades** of the later publishing agency per product and year taking the values 1 and 0
- Clustered standard errors on the insurer-level

4. Empirical Analysis – Hypothesis 4: Results

Results on Hypothesis 4a – The downgrade case ⇒ Follower follows the leader

	Morgen & Morgen			Stiftung Warentest						
Sample	N = 415			N = 245			N = 153			
	coefficient	p-value		coefficient	p-value			coefficient	p-value	
Period t-1										
Follower downgrade in period t-1	-0.190	0.548		-0.955	0.001***			-5.072	0.000***	
Follower rating in category 4 or 5 in period t-1	0.160	0.553		0.884	0.008***			-3.883	0.000***	
Leader downgrade in period t-1	0.922	0.000***		0.216	0.364			1.089	0.043**	
Leader rating in category 4 or 5 in period t-1	0.254	0.434		-0.335	0.186			0.170	0.795	
Period t-2										
Follower downgrade in period t-2								-0.134	0.597	
Follower rating in category 4 or 5 in period t-2								5.206	0.000***	
Leader downgrade in period t-2								0.503	0.092*	
Leader rating in category 4 or 5 in period t-2								-0.349	0.586	
Pseudo R²	0.0905			0.0932				0.1994		
*** Indicates the difference from zero is statistically significant at the 1% confidence level; ** 5% confidence level and *10% confidence level.										
Note: To test for robustness we also included year dummies with no change in results.										

4. Empirical Analysis – Hypothesis 4: Results

Results on Hypothesis 4b – The upgrade case ⇒ No significant reaction!

	Morgen & Morgen			Stiftung Warentest					
Sample	N = 415			N = 209			N = 125		
	coefficient	p-value		coefficient	p-value		coefficient	p-value	
Period t-1									
Follower upgrade in period t-1	-0.415	0.412		omitted			omitted		
Follower rating in category 3 or 4 in period t-1	1.421	0.000***		1.200	0.002***		1.800	0.016**	
Leader upgrade in period t-1	-0.058	0.803		0.434	0.237		0.741	0.307	
Leader rating in category 3 or 4 in period t-1	-0.380	0.149		-0.212	0.388		-0.113	0.892	
Period t-2									
Follower upgrade in period t-2							-1.363	0.012**	
Follower rating in category 3 or 4 in period t-2							-1.402	0.021**	
Leader upgrade in period t-2							0.784	0.112	
Leader rating in category 3 or 4 in period t-2							0.512	0.578	
Pseudo R²	0.1611			0.0797			0.1650		
*** Indicates the difference from zero is statistically significant at the 1% confidence level; ** 5% confidence level and *10% confidence level.									
Note: To test for robustness we also included year dummies with no change in results.									

5. Conclusion

We find...

- ... clearly positive relationship between net premiums of the insurer and product rating, but larger firms may offer better products (e.g. Barney, 2001)
→ Is firm **size effect** an indicator for rating bias or for better products offered by larger companies?
- ... significantly different effects between rating agencies for public and stock insurers.
- ... no evidence for rating bias caused by great product portfolios, long-lasting business relationships or competition between rating agencies.

5. Conclusion

- Even if possible triggers for rating bias could be identified for the case of insurance product ratings, there is less indication of systematic rating bias as compared to other rating markets.
- Rating market design seems to prevent major market distortions:
 - No contractual relationships between rating agencies and rated companies.
 - No fee-based rating.
 - Charges for rating seals are quite low.
 - Rating agencies' business models are diversified: revenues from rating seals represent only a small share of rating agencies total income.



Implications
for the design
of other rating
markets



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Thank you for your attention!



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Backup

Backup: Background

- Theoretical basis
 - Quality uncertainty (Akerlof, 1970)
 - Quality certification (Viscusi, 1978; Leland, 1979)
- Rating (market) quality
 - Literature review (Dranove & Jin, 2010)
→ **One major quality criterion for the functioning of rating markets: Unbiasedness!**
- German market for insurance product ratings
 - Rating systems and legal environment (Everling, 2004; Dambacher & Gatzert, 2011(WP))
 - Rating market structure and rating characteristics (Meyr & Tennyson, 2014)
 - Studies on the use and importance of insurance product ratings (Romeike, 2004; Assekurata, 2006)

Backup: Empirical Analysis – Data

Ratings...

Number of observations	Year of Rating														
	1999	2000	2001	2002	2003	2004	2005	2006	2007	2008	2009	2010	2011	2012	2013
Morgen & Morgen	246	183	188	178	193	229	265	303	342	348	361	352	344	356	356
Finanztest	0	110	106	0	93	138	89	83	85	55	78	39	54	0	74
Total	246	293	294	178	286	367	354	386	427	403	439	391	398	356	430

Backup: Empirical Analysis – Data

Insurer Characteristics...

Variable	Obs	Mean	Std. Dev.	Min	Max
Age of insurance company	987	75.28	51.06	7	208
Log net premium (TEUR)	986	12.58	1.58	6.03	16.60
Number of rated products	989	3.59	2.86	1	22
Loss ratio (in %)	987	68.31	34.59	1	219
Cancellation quota (in %)	955	5.10	2.70	1	45
Average sum insured per contract (TEUR)	957	31.14	19.06	0.024	110.59
Organizational form of insurance company	3485	2,483 (71.23%)	809 (23.21%)	113 (3.24%)	8 (2.30%)

Backup: Empirical Analysis – Hypotheses 1 to 3

Insurer characteristics & business relationship

- Design of contractual relationships as major source rating bias:
Danger of inflated ratings when ratings are solicited and paid by the rated companies (Strier, 2008; Poon, 2003).
 - Product ratings are typically not commissioned and rating agencies choose which products to rate. Both aspects are remedies for rating bias (Bolton et al., 2012).
 - Further quality enhancing aspects of the product rating market:
 - proportion of revenues per customer (rating seal license fee) quite small (Beaver et al., 2006)
 - revenue base of rating agencies diversified (Covitz & Harrison, 2003)
- Also insurer characteristics could cause conflicts-of-interest.

Backup: Empirical Analysis – Hypotheses 1 to 3: Variables

Insurer characteristics & business relationship

Variable	Obs	Mean/ Median	Std. Dev.	Min	Max	Expected direction of influence
Log net premium (TEUR) (H1)	986	12.58	1.58	6.03	16.60	+
Number of rated products per insurer per year (H2)	989	3.59	2.86	1	22	+
Number of years rated in a row by Finanztest (H3)	3485	0.63	1.39	0	10	+
Number of years rated in a row by Morgen & Morgen (H3)	3485	4.64	3.47	0	15	+
Age of insurance company	987	75.28	51.06	7	208	+/-
Increase in loss ratio (between t and t-1)	958	0.06	0.44	-0.99	10.50	+
Cancellation quota (in %)	955	5.10	2.70	1	45	-
Average sum insured per contract (TEUR)	957	31.14	19.06	0.02	110.59	+
Organizational form of insurance company	3485	Stock company 2,483 (71.23%)	Mutual 809 (23.21%)	Public- service enterprise 113 (3.24%)	Establish- ment of foreign company 80 (2.30%)	?

Backup: Hypothesis 4: Methodology

Competition between rating agencies

$$\Pr(\text{Follow_Down}_{it} = 1)$$

$$= \Pr(\beta_0 + \sum_{j=1}^T \beta_1 \text{Follow_Down}_{t-j} \\ + \sum_{j=1}^T \beta_1 \text{Follow_HR}_{t-j} + \sum_{j=1}^T \beta_1 \text{Lead_Down}_{t-j} \\ + \sum_{j=1}^T \beta_1 \text{Lead_HR}_{t-j} + \epsilon_{it})$$

$$\Pr(\text{Follow_Up}_{it} = 1)$$

$$= \Pr(\beta_0 + \sum_{j=1}^T \beta_1 \text{Follow_Up}_{t-j} \\ + \sum_{j=1}^T \beta_1 \text{Follow_HR}_{t-j} + \sum_{j=1}^T \beta_1 \text{Lead_Up}_{t-j} \\ + \sum_{j=1}^T \beta_1 \text{Lead_HR}_{t-j} + \epsilon_{it})$$