What Is the Property and Liability Insurance Business?

by
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My colleagues all over Asia

- Are awed by all the empirical papers on insurance that people in the United States publish based on the data sources available there.
- Actually the sources we have are not so good.
- And maybe it follows that the papers are not so good.
- That is what I will talk about.

Why should we care?

- Empirical research requires the use of data.
- The data sources available to us differ even in the number of units that they include in any given year.
- It is useful to have some rough measures of the size of the business (and its components) so we can assess how complete the data sets are.
- The answers can serve both to decide which data base to use and to assess the credibility of the results.
- Or even to decide whether we should believe a study based on only one data source.

Why is this not known more widely?

- The people who sell the data are not going to tell you.
- The authors that use the data in their research won't tell you either.
- And the editors of the journals do not want to print comments that say the data is not what the authors say it is.
- So everybody writes about how good the data is.
- Nobody really is interested in assessing reality.
- Eventually everybody comes to accept it as the truth.
- With maybe a few exceptions.

An example of how confusion is spread

- Winter (1994) states: "The actual data are annual for the aggregate U.S. property-liability market over the period 1948-1988" and then proceeds to present data for **stock insurers** "from 'Best's *Averages and Aggregates'* (*sic*)."
- Best's is not, and has never pretended to be a complete enumeration of the U.S. market or even of the stock insurers operating in the U.S.
- Worse, Winter models the whole market and stock companies lost market share to mutual companies fairly steadily over the period that he uses, 1948-1988.
- But that also depends on whether you count fully owned stock subsidiaries of mutual companies as "stock companies" or "mutual companies."

I would like to cover a few basic points

- To look at what different sources tell us about the size of the P&L insurance business (by type if possible).
- To compare the results and see if we can guess at the sources of the differences.
- I will look specifically at three items:
  - the total number of companies,
  - the total assets they hold, and
  - the total premiums they write.

Overall Results

- There appear to be somewhere between 2,400 and 3,300 P&L insurers in the U.S.
  - Roughly 1,875 to 1,975 are stock insurers, 420 to 490 are mutuals, 57 to 68 are reciprocals, and 63 to 65 are Lloyds.
- Their liquids assets appear to be in the range of 690 and 865 billion dollars.
- The annual premiums appear to be in the range of 280 to 330 billion dollars.
- The magnitude of these ranges may make you uneasy.
- And feel more comfortable using your own data.

Major Sources

- Two major sources used in empirical studies are:
  - A.M. Best's *Aggregates and Averages*
  - NAIC
- These are the ones most often used in research, especially longitudinal studies of the P & L business.
- They are available on electronic media which makes them convenient.
- People will lead you to believe that these are time series.
- They are not; they are a collection of cross-sections with not enough continuity to rate as a time series.
- Standard and Poors also has data in electronic form, but I have never had access to it.

Other Sources

- Are, so far as I know, available only in hard copy.
- The Insurance Information Institute (I.I.I.) has provided counts of P&L companies by state for a long period of time.
- The Federal Reserve Board, in its “Flow of Funds” (FoF) reports, tallies the assets of P&L companies.
- More recently, OECD has published data on the insurance business.
- Best’s “KeyGuides” are also useful.

Other Sources (continued)

- There are various other sources which have provided information over limited time spans. These are not included in this study, mostly they indicate that reciprocals and Lloyd companies are much more numerous than those reported in A.M. Bests *A&A*.
- The U.S. Census is notable by its absence among direct sources. Their data on insurance comes from either I.I.I. or A.M. Best’s.
- If your country has a census that includes insurers you may have much better data even if it is not so frequent.

Two obvious problems

- A count represents the number of entities present at a given time. None of the sources gives a clear indication of a specific time at which the enumeration might be valid.
- What is a P&L insurer is also a matter of concern.
  - Is it a company with a charter in at least one state?
  - Does it have to operate in more than one state?
  - Is it a company that is actually chartered and funded?
  - Does it need to have conducted any insurance business in the year in question?
  - Or ever?
- The publications do not tell us, so your guess is as good a mine.

Less obvious problems

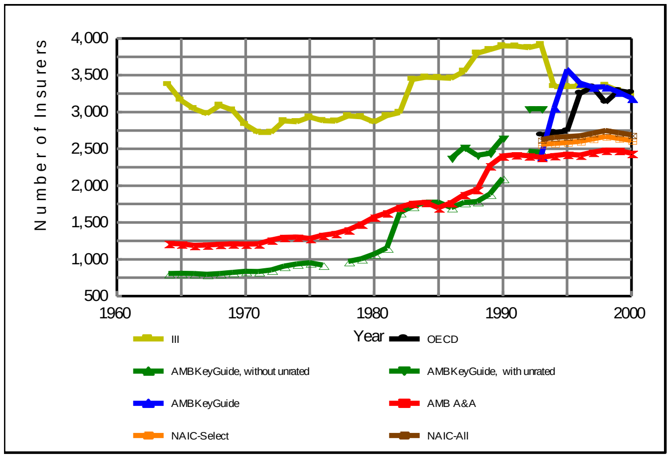
- There are, of course, many less obvious problems.
- The most important of these will be discussed later.
- But there is one problem of MAJOR importance:
- **Neither A.M. Bests *A&A* nor the NAIC database should be considered time series.**

They are sequences of cross-sectional data

- For the *A&A*, which has the longer history and provides hard copy with annotations about changes, it is rare to find a five-year period with no major change in the data.
- The companies included change from year to year not just with entries and exits into the business but also with omissions.
- My estimate is that no more than 95 percent of active companies are actually in the databases in any one year.
- The definitions of lines of insurance also change.
- So do the definitions of asset classes and liabilities.
- If you interpret these as series you do so at your own peril.

The number of insurers

The Number of Insurers



A Synopsis

- The holes in the data correspond to publications that I could find neither the Temple University Library, the University of Pennsylvania Library, not the College of Insurance Library.
- The I.I.I. numbers are much higher than those of other sources until the mid-nineties.
- The OECD, which enumerates “non-life” rather than “P&L” is the next highest.
- The NAIC “all”, which includes risk retention groups, captive insurers, and reinsurers is the next highest.
- It is worth noting that the NAIC is interested primarily in entities that operate in more than one state.

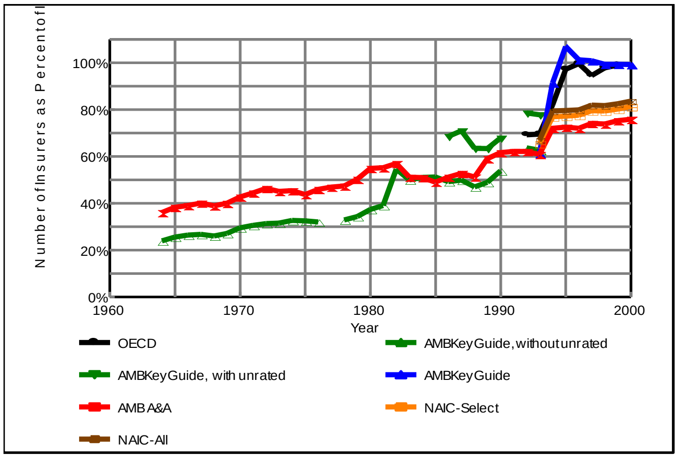
Interesting Points

- Best's *A&A*'s coverage appears to have increased substantially over time, especially in the late 1980's.
- That is probably when competition with the NAIC data base became significant.
- Best's *A&A* sometimes has fewer insurers that their Rating Guide.
- The NAIC data includes some 800 insurers fewer than the I.I.I. and some 300 fewer than the issues of Best's KeyGuide that give both rated and unrated companies.

Problems and sources of difference

- The I.I.I. publications have problems.
  - Some issues of "Insurance Facts" appear to mislabel the year to which the numbers pertain.
  - Insurers by state do not always add up to the total.
- OECD uses "non-life" rather than "P&L"; the difference is primarily from companies that write only health coverages.
- It may also include mortgage insurers, title insurers...
- Best's basis changes over time from "casualty" to "fire and casualty" to "property and casualty" to "property and liability".

Another Perspective



Overview

- Over the years the coverage in Best’s *A&A* as a percent of insurers enumerated by I.I.I. has increased steadily.
- The NAIC coverage also appears to be increasing.
- It may be that I.I.I. numbers represent the insurers licensed to do business in the individual states, some of these may not be operating.

Assets

Assets

- Over the long term there are two sources for assets of insurance companies:
  - The "FoF" reports of the Federal Reserve Bank.
  - Best's Aggregates and Averages.
- The NAIC and OECD have only relatively recent data.
- The FoF reports give "liquid assets" and appear to apply to "non-life" insurance.
- Comparisons are not so easy because "liquid assets" are not defined in detail and there are issues of consolidation versus aggregation.

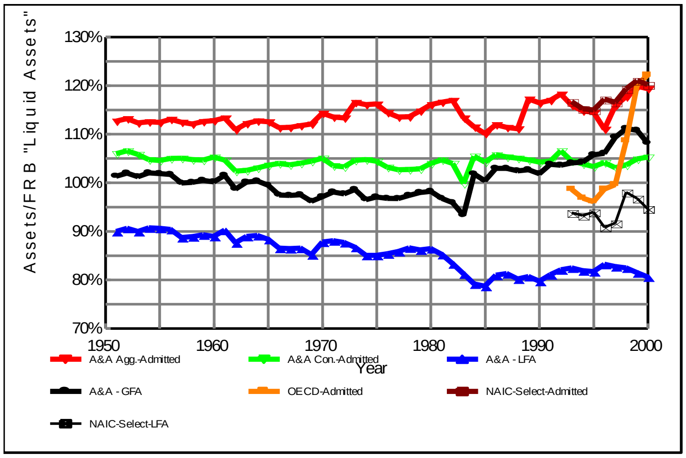
Notation

- The graph uses
  - "GFA" for gross financial assets, LFA plus investments in affiliates.
  - "LFA" for the sum of bonds, common and preferred stock, cash, and short-term investments.
- It labels as "Agg" the aggregate numbers, all others are my best attempt at consolidated numbers.

The Data

- A plot, even on a logarithmic scale would not be very helpful.
- Over the period 1950 to 2000 the assets increased approximately 100 fold.
- The assets as a percent of those given in the FoF reports are shown in the figure.

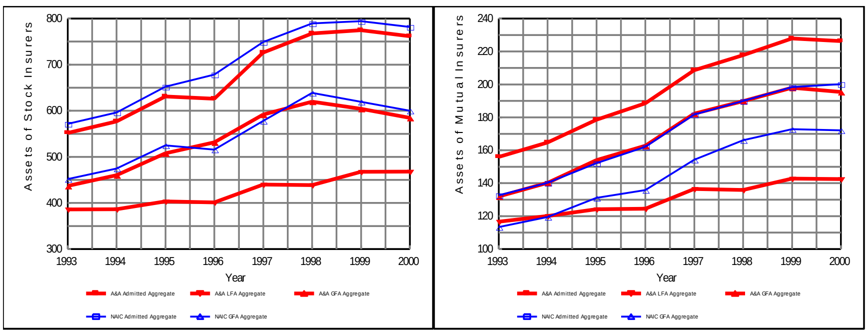
Assets/FoF “Liquid Assets”



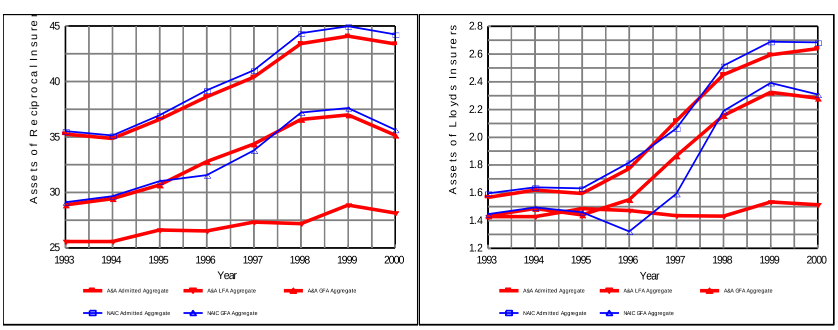
Overview

- If you accept my view of what “financial assets” might mean, Best’s *A&A* accounted for about 90 percent of those counted in the FoF report in 1950 and declined to 80 percent of those counted in the FoF report of 2000.
- Remember that FoF counts liquid assets of other insurance, not just property and liability, so this does not necessarily represent an adverse trend. We would need to know how other lines, such a title, mortgage guarantee, and so on fared in the interval before we can reach a conclusion.

Data by Segment—Stocks and Mutuals



Data by Segment—Reciprocals and Lloyds



Overview

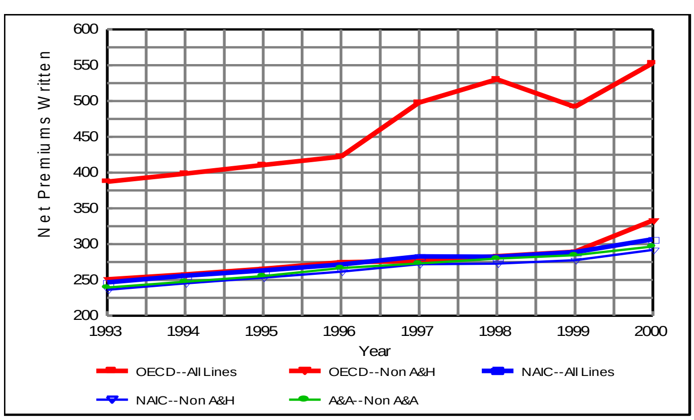
- Despite differences, the NAIC data base and the *A&A* data base now cover the non-captive private market to about the same extent.

Premiums

Premiums

- The comparison of premiums is complicated by the "P&L" versus "non-life" differences.
- A crude comparison is provided in the graph.

Data on Premiums



Overview

- It is clear that the OECD "non-life" premium data overstates the total "P&L" net premium written.
- Removing the accident and health premiums from both the "non-life" and "P&L" totals brings the two sets of data into much closer agreement.
- The discrepancy in the adjusted data is much larger for 2000 than for the earlier years.
- Lines other than accident and health appear to contribute little to the difference between "non-life" and "P&L"

Some Potential Problems

- The NAIC data, which I have in some detail, suggests some potential problems:
  - In each of the years some 100 companies (about 4 percent) have zero **written, earned, and direct premiums** , they account for less than 0.2 percent of industry assets.
  - Companies with zero **net premium written** in any given year account for 4.9 to 22.1 percent of the total assets of insurance companies in the NAIC data.
  - The largest such company in any given year accounts for 3.5 to 4.3 percent of the total assets and reinsures all its business.

More Potential Problems

- For the period covered a number of companies (15 to 67 in individual years) have gross financial assets (liquid financial assets plus investment in affiliated companies) in excess of admitted financial assets.
  - The largest ratios of gross financial assets to admitted assets for the aggregate of these companies in the year ranges from 1.4 to 2.3.
  - According to the NAIC staff, these companies are small and typically have negative agents' balances.

Some comments

- The data are generally consistent but suggest that there are problems in comprehensiveness.
- The fact that the number of companies in Best's *A&A* is occasionally lower than that in the KeyGuide is of particular concern. It implies that the *A&A* data sometimes omit individual insurers.
- This arises because some insurers did not report their data on a timely basis.
- In turn that implies the Best is still providing ratings for insurers that have not submitted data.

I found that of special concern

- My working hypothesis is that companies that are in trouble will tend to skip reporting to Best and seek waivers from the regulators from filing with the NAIC.
- The only way I could think of testing that hypothesis with the available data was to examine the relation between the change in the number of companies reporting and the major components of income.

I used as a model

$$\frac{N(t+1)-N(t)}{N(t)} = a + bU(t) + cf_s(t)R_s(t) + d\big(1-f_s(t)\big)r_T(t)$$

- where
  - $N(t)$ is the number of companies included in year t,
  - $U(t)$ is the underwriting profit margin before dividends to policyholders
  - $f_s(t)$ is the fraction of industry assets invested in stock at time t,
  - $R_s(t)$ is the rate of return on the S&P index at time t,
  - $r_T(t)$ is the interest rate on 90-day Treasury notes at time t.

Using data from 1952 to 2001

- The results for stock companies were:

VARIABLE NAME	ESTIMATED COEFFICIENT	STANDARD ERROR	T-RATIO with 46 DF	P-VALUE
UPBD	0.23650	0.06397	3.697	0.001
S&P*%Stock	0.12478	0.05579	2.237	0.030
R*(1-%Stock)	0.90698	0.19850	4.568	0.000
CONSTANT	-0.01167	0.00781	-1.495	0.142

- The intercept is not significantly different form zero, as one might expect.
- The sign of the other coefficients are consistent with the hypothesis that companies do not report when they are in trouble.
- For mutual companies the results were weaker but with the same signs for the three meaningful coefficients.

It seems that

- It is not wise to ignore the effects of self-selection.
- Nobody seems to worry about that in the case of companies.
- But a great deal of our literature is devoted to self-selection by policyholders.
- I do worry, and am actively trying to get data on individual companies that do not file.

Some recent findings

- Recent versions of the Best and NAIC data reveal some interesting features:
  - Most spelling mistakes in the company information are exactly the same if both.
  - I believe that arises because companies now submit the same electronic documents to both but it could also be that they buy each other's databases.
  - A few groups that at classified as P&L by Best and classified as L&H by NAIC.

Worry, worry, worry

- Private communications with A.M. Best's have confirmed that failure to report data is a reason for exclusion.
- This is of concern because that makes inclusion in the *A&A* a matter of self-selection.
- Analyses conducted so far indicate that incomplete reporting is not uncommon and suggest that poor operating results may be a factor in the decision to not submit data on a timely basis.

Conclusions

- The major sources of data cover a high proportion of the P&L insurance activities in the United States.
- Each set has its own limitations.
- No set is completely comprehensive and in both sets the data across years may not be comparable because of exclusions due to failure to submit data.
- Self-selection may play a role in the submission process so any analysis should assess the possible effect of this on the results.

And

- Empirical work needs to be interpreted with a great deal of skepticism.
- “Support” based on the data should not be taken as solid proof that the underlying model is correct.

- Thank you for your attention!