Hitchhiker's Guide to European Motor

CARe

Halina Smosna

May 18-19, 2009

Agenda

- Overview
- Regulatory Environment
- Claims
- Lump Sum vs. Annuity
- Challenges
- Inflation
- Solutions
- Indexation
- Exposure Curves

Endurance
YOUR RISK IS OUR FOCUS

Overview

- Similar to US Worker's Comp (except no NCCI Blue Books with excess factors by jurisdiction)
  - Unlimited Bodily Injury Cover in many countries, PD is less material although there have been some very large PD claims
  - 5th EU Motor Insurance Directive increased minimum BI/PD limits
  - Green Card system essentially makes all of Europe unlimited
  - Government mandated discount rates and mortality tables which insurers use to establish case reserves
- Highly competitive – both insurance and reinsurance
  - Insurers regularly target combined ratios well over 100%
    - Reinsurers typically write to a CR of 115+%
      - In some jurisdictions seeing reinsurance pricing hardening perhaps in response to dropping interest rates
        - Belgium:XOL rates increased from 2001-2005; stagnated from 2005-2007; in 2008 small increase on xs2M Euro layers but decrease on lower layers
    - Reinsurance usually written on XOL basis
    - Cash flow underwriting – very long payment patterns
  - Most European Motor Treaties are indexed for inflation.

Endurance
YOUR RISK IS OUR FOCUS

Fifth European Directive

- Adopted May 2005
- Increased coverage
  - No impact in countries that offered unlimited coverage
  - Significant impact in countries at low minimum statutory limits
  - Most heavily impacted is Southern & Central Europe
    - New member states were particularly impacted as they historically had lower minimums
- Reinsurance pricing will need to increase
- Coverage minimums
  - 1M Euro per BI victim or 5M Euro per BI claim
  - 1M Euro per PD claim
  - Countries had 5 years to implement but needed to reach one-half the required level in 2.5 years
  - Index every 5 years based on EICP (European Index of Consumer Prices)

Endurance
YOUR RISK IS OUR FOCUS

Green Card

- Green Card Protection (40+ countries)
  - Driver causes a loss abroad in a country that is part of the Green Card Agreement
    - Insurance provided no less than at statutory minimum in country where the accident occurred
  - Higher coverage amount than in the policy may apply on accidents abroad
    - If an Italian causes an accident in France
    - And Italian vehicle has limited liability coverage
    - Italian insurer will automatically give unlimited liability coverage for BI losses
  - Inverse
    - Coverage is higher than the statutory minimum in the foreign country where the accident took place
    - If the French vehicle causes the accident in Italy, he has unlimited coverage for BI
  - Coverage amount of liable party's policy is only of theoretical value

Endurance
YOUR RISK IS OUR FOCUS

Statutory Minimums

UK	Unlimited for Bodily Injury (BI), GBP 20m plus cost up to GBP 5m for Property Damages (PD). There is no foreseeable change to current legislation expected.
Ireland	Unlimited for BI. No foreseeable change.
France	Unlimited for BI, no foreseeable change
Germany	EUR 2.5m per victim for BI. Market practice has however been that virtually all insured took higher limits. Until 2002 unlimited cover has been offered, this was replaced by EUR 50m per event and then EUR 100m per event since 2005. Because of automatic renewal practice the run off of the unlimited policies is very slow. It is expected that there will still be 10% of unlimited policies in 2008.
Switzerland	CHF 100m per event for PD and BI. Market practice has been to offer unlimited until 2003, last unlimited policies expected to run-off by 2009.
Belgium	Unlimited for PD and BI, projected legislation to reduce to EUR 100m.
Italy	EUR 774,685 per event for PD and BI for private cars. 40% of insured buy higher limits up to EUR 10m. Minimum limits to be increase in accordance with 5th EU directive.

Historical Large Losses

Name	Year	Total Loss Estimate	Loss to Motor Policy	Country	Description
Mont Blanc Tunnel	1999	€198m	€8m	France	Volvo truck caught fire in tunnel causing 39 deaths and multiple injuries, property damage and business interruption. MTPL, Product Liability and tunnel operators' liability. TPPD was limited under the original policy. The tunnel was closed for 3 years for repairs
Selby Rail Crash	2001	£33m (€42m)	£33m (€42m)	UK	Insured driver fell asleep at wheel of his Land Rover, crashed through road barrier onto railway line. Passenger train hit Land Rover causing it to derail and collide with another oncoming goods train which also derailed. 13 deaths, 70 injured, property damage and business interruption.
Tauern Tunnel	1999	€30m	?	Austria	Motor crash left 12 dead, 49 injured and caused property damage and business interruption. The tunnel was closed for 3 months for repairs
Brenntag	1992	€23m	€23m	Germany	Chemical was mistakenly unloaded by tanker lorry into wrong tank, causing explosion, 2 deaths and extensive property damage and business interruption.
Los Alfaques	1978	€20m	-	Spain	Liquid petroleum gas tanker crashed and exploded next to a camping site leaving 500 injured and 101 dead. This was not a MTPL loss as Entrepol, the liquid petroleum company were liable for overfilling the tanker.

Endurance
YOUR RISK IS OUR FOCUS

Claim Components

- Medical
  - Hospital charges, medical treatments, transport costs, medication
  - Usually paid by victim's health insurer which then seeks to subrogate
- Cost of Care
  - home, in a facility, by family member or professional care giver.
  - Cost of Care has increased dramatically and is the major cause of escalating reserve levels
  - Per year loss is (410 days)* (daily rate) to account for caregivers paid leave unless injured party is in a facility (France)
- Loss of Earnings
  - Based on pre-accident earnings
- Pain & Suffering (P&S)
  - Sometimes next of kin can claim P&S if injured party dies or is severely disabled
- Loss of Amenity/Aesthetic Harm
- Retraining costs
- Decorating & Gardening (UK)
- In some countries the damages maybe reduced if the claimant was negligent (no seatbelt)
- Punitive (not all countries)

Endurance
YOUR RISK IS OUR FOCUS

Lump Sum vs Annuity

- Lump Sum vs Annuity Payments
  - In the event of recurring losses (long term care, loss of earnings) for permanently disabled victims compensation can be either of the above
  - UK more lump sums but moving towards annuities (PPOs: Periodic Payment Orders)
  - France more annuity /structured settlement
  - In Germany payments may be lump sum, annuity or pay as you go through the claimant's life.
  - If annuity: sometimes law dictates interest rate and mortality table assumptions
    - France dictates that the discount rate can be no more than 60% of the TME (Government bonds) with a ceiling of 3.5%
  - Sometimes annuity rules apply to the lump sum calculation as well
  - Annuities /PPOs
    - Guaranteed payments
    - Claimant can't exhaust lump sum
    - Insurer assumes investment risk, inflation risk, credit risk (on their reinsurers)
    - Higher claims & administrative costs for insurer

Lump Sum vs Annuity in the UK

- Lump sums based on Ogden Tables are prevalent but this is changing
- Judges were always entitled to settle BI claims with PPOs/annuities but was generally only awarded for minors
- Lump sums and annuities are derived by discounting future payments and the value depends on
  - Mortality
  - Inflation index
  - Discount rate
- If those values coincided, the insurer and claimant should be indifferent as to the type of settlement.
- Some claimants thought they could achieve investment returns greater than the discount rate so preferred the lump sum.
- If lump sum mismanaged NHS was on the hook for care
- NHS went before the Court of Appeals in some high profile cases
- In the UK the RPI (Retail Price Index) was used in annuity/PPO calculations as the inflation index for future care costs.
- It was argued that the RPI did not capture the full effects of inflation
- In Thompstone v Tameside/NHS Trust (January 2008) the index was changed to the ASHE 6115 – Annual Survey of Hours and Earnings for care workers.
- As a result some argue that the annuities (periodic payment options PPOs in the UK) might become more popular
- Another societal advantage of PPOs is that compensation is matched to the victim's needs

Challenges

- High value BI claims being paid as annuities impacted by changes in:
  - Mortality tables, inflation, discount rate
- Volatility in loss experience
- Best way to handle annuities is to have the ceding company buy an annuity from a life company
  - Discounted lump sum would be the reinsurance claim
  - Life insurers in Europe reluctant to cover these claims
- Unlimited coverage
- Lack of industry exposure curves
- Lack of reliable public data
- Medical progress extends injured lives
- Pricing in countries where limits were low historically (free cover) but now increased: 5th Directive
- As the discount rate in the annuity changes over time
  - loss development patterns are impacted
  - Trends are difficult to discern
- Other issues for Loss development:
  - Higher future claims inflation
  - Increased life expectancy
  - Mixture of payment methods (annuity, lump sum, pay as you go)

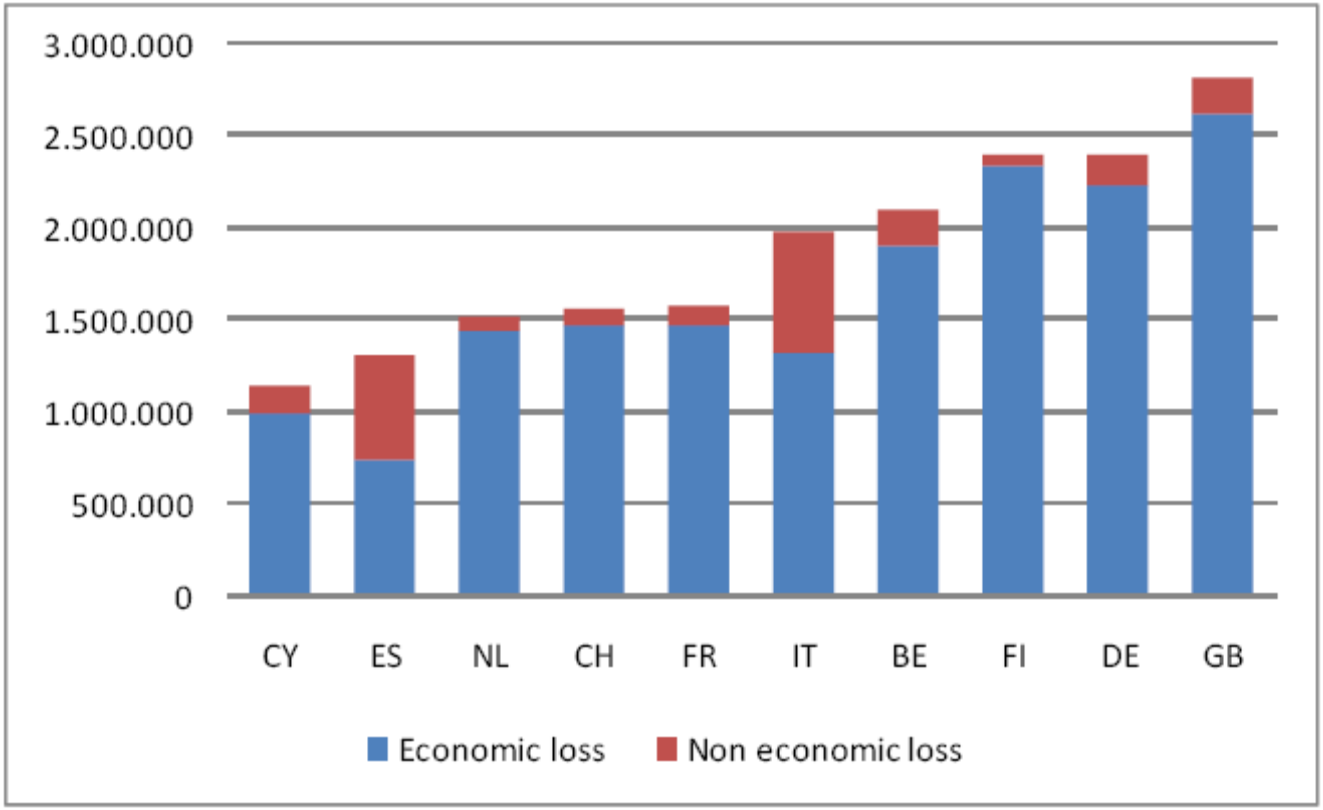
Challenges cont'd

- Inflation/Leveraged impact of trend on XOL reinsurers
- Legal changes with retroactive claims' impact
- Cases reopened
- Some countries experiencing higher frequency of severe BI cases despite overall frequency declines
- Reserves were increased dramatically as insurers and XOL reinsurers surprised by large increases from very old AYs
- There are substantial differences in compensation across Europe depending on the legal and social system (next slide)
- Victim's age at loss occurrence is a significant factor. XOL claims include mainly young victims. This adds to volatility
- This increases the settlement period for reinsured losses
- Reserves are difficult to predict
- Markets where the care of the catastrophically injured is deemed the responsibility of the state have been spared from cost of care inflation
    - What if this changes?

CEA Dec07 Study

AT	Austria
BE	Belgium
CH	Switzerland
CY	Cyprus
CZ	Czech Republic
DE	Germany
DK	Denmark
EE	Estonia
ES	Spain
FI	Finland
FR	France
GB	United Kingdom
GR	Greece
HR	Croatia
HU	Hungary
IE	Ireland
IS	Iceland
IT	Italy
LU	Luxembourg
LV	Latvia
MT	Malta
NL	The Netherlands
NO	Norway
PL	Poland
PT	Portugal
RO	Romania
SE	Sweden
SI	Slovenia
SK	Slovakia
TR	Turkey

Graph 46 | Indemnity to a notary - 40 years - Paraplegia

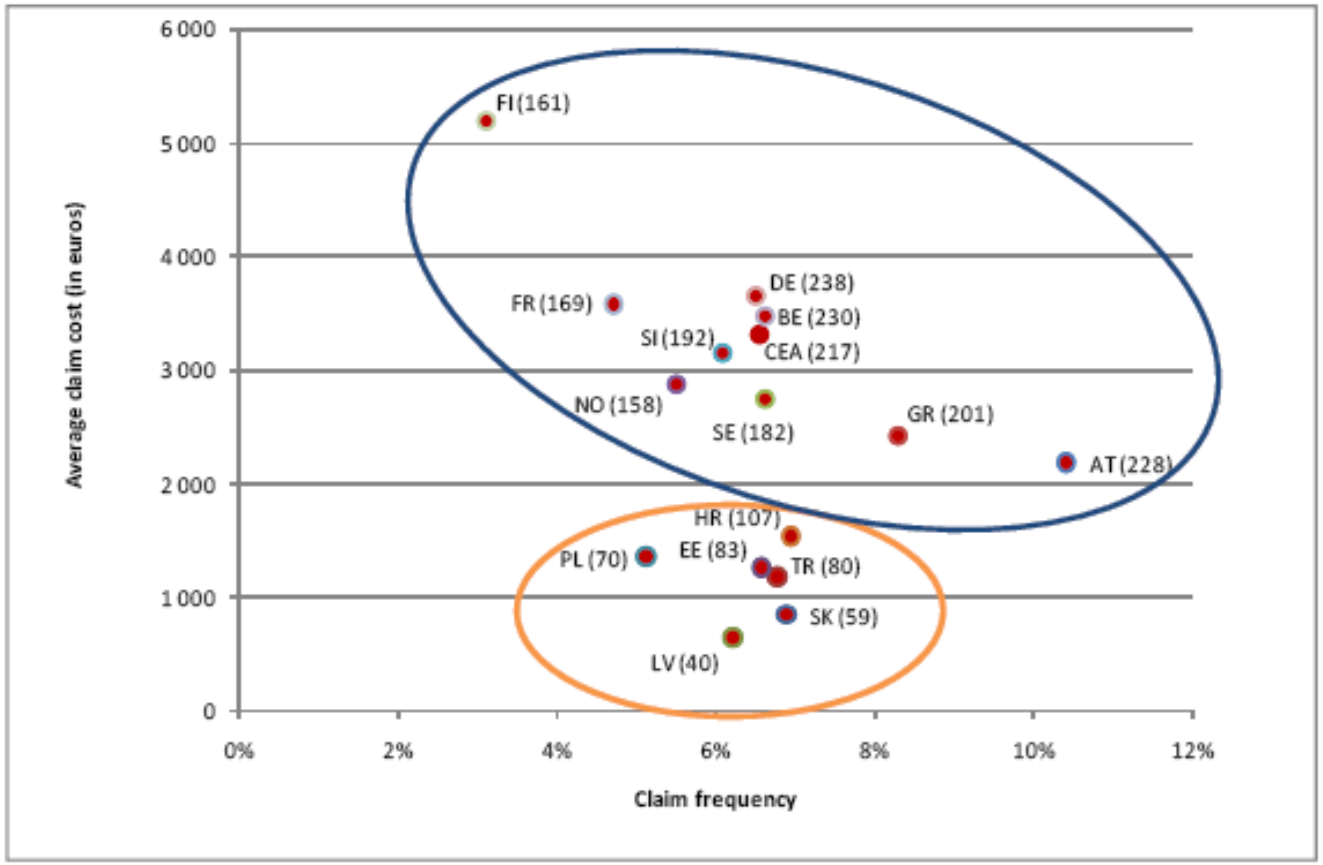


Endurance
YOUR RISK IS OUR FOCUS

CEA Dec07 Study

AT	Austria
BE	Belgium
CH	Switzerland
CY	Cyprus
CZ	Czech Republic
DE	Germany
DK	Denmark
EE	Estonia
ES	Spain
FI	Finland
FR	France
GB	United Kingdom
GR	Greece
HR	Croatia
HU	Hungary
IE	Ireland
IS	Iceland
IT	Italy
LU	Luxembourg
LV	Latvia
MT	Malta
NL	The Netherlands
NO	Norway
PL	Poland
PT	Portugal
RO	Romania
SE	Sweden
SI	Slovenia
SK	Slovakia
TR	Turkey

Graph 28 | Pure premium, claims frequency and average claim cost in 2005



Note: The figures between brackets indicate the level of pure premium in euros.

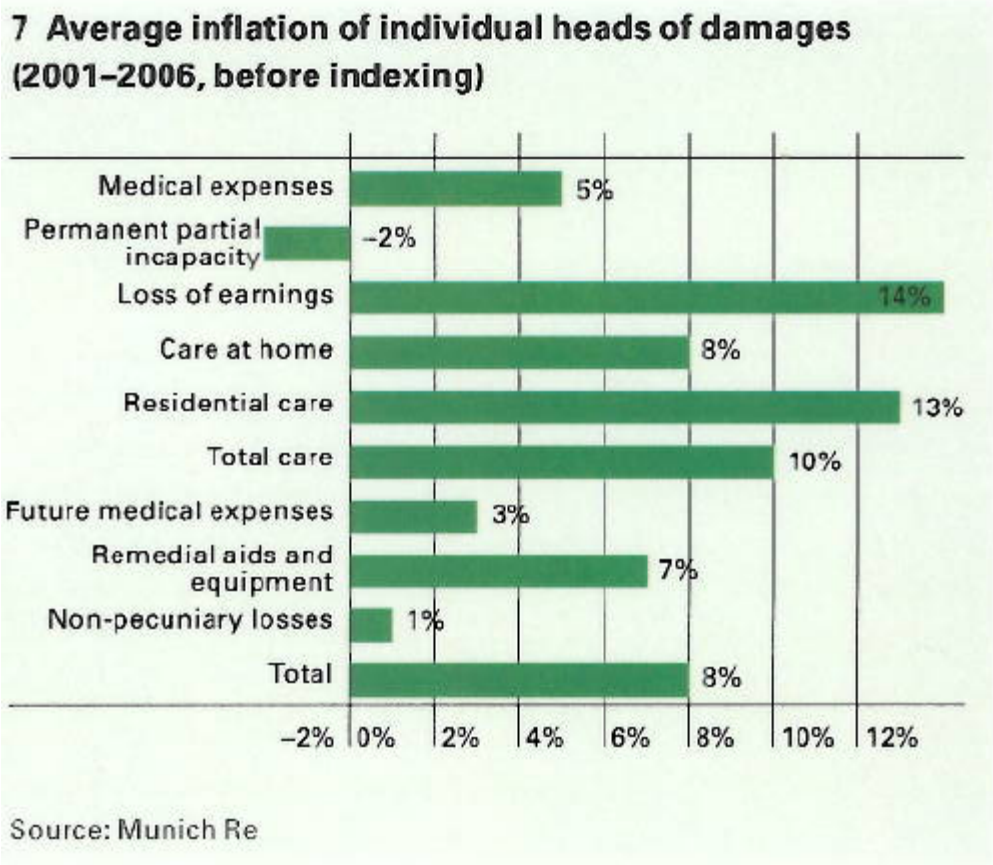
Endurance
YOUR RISK IS OUR FOCUS

Let's Go France

- Munich Re Study (Severe Personal Injury claims in Europe relating to Motor Insurance)
  - Looked at inflation by type of damage from 2001-2006
  - France: Loss of earnings +14% p.a.
  - France: Residential Care +13% p.a.
  - France: Care at home +8% p.a.
  - France: Medical +5% p.a.
  - France: Long Term Medical +3% p.a.
  - France: Non-pecuniary +1% p.a.
- Munich Re study looked at over 800 large claims from 1980-2006
  - Claims in the Munich Re database are limited to claims with gross incurred losses of €2 million or more for accident years 1980-1989 and €3 million or more for the years 1990-2006
    - mostly head, brain, upper spinal cord injuries
    - Half of the claimants under the age of 20 at injury
- Axis Re Study
  - Cost of Care +10% p.a. 2001-2006
  - Annual average inflation of large claims was 9.4% between 2001 & 2006 (Large Claim: BI Losses with disability of more than 50%)

Endurance
YOUR RISK IS OUR FOCUS

Munich Re study: France



Non-pecuniary at +1%. Economic losses are the real the cost drivers

Endurance
YOUR RISK IS OUR FOCUS

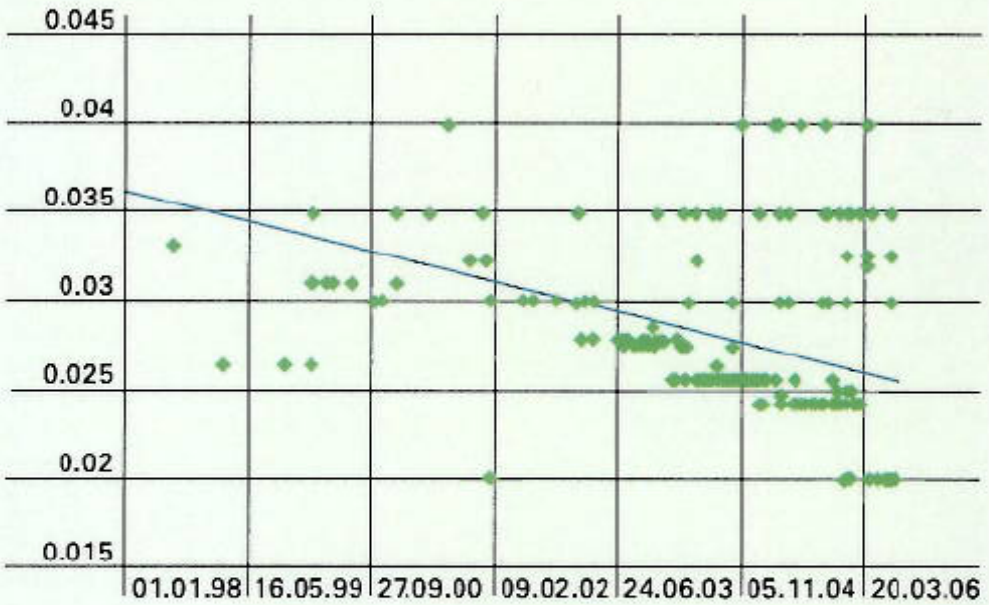
Let's Go France

- Unique features of French law lead to long settlement periods.
  - Coverage is unlimited
  - Claims can take up to 20 years to be fully settled.
  - Motor vehicle accident claims can be submitted up to 10 years after the accident
  - Important definition: CONSOLIDATION – refers to the stabilization of the victim's condition. It is the final stage at which all treatments & technologies have been explored and no further improvement is expected.
  - To calculate the total loss there is a distinction drawn between pre and post consolidation
    - PRE: medical, rehab, loss of earnings – usually settled on the basis of actual disbursements plus NPV of costs estimated through to consolidation point
    - POST: future losses (cost of care, medical, loss of earnings) are calculated factoring in life expectancy and inflation. Then NPV'd
    - In 1996 the French state laid down rules for insurers concerning the creation of prudent annuity reserves (specific mortality table; discount rate = Max(60% TME, 3.5%)
    - Reserves for lump sum payments were not affected by the regulations although this is changing
    - Minors must reach adulthood before consolidation
  - Social insurance carriers (ie the victim's employer provided health care provider) can subrogate from responsible parties and their insurers
  - Munich Re study they have stats that show that consolidation "is achieved" by the 4th year in 36% of cases and 80% of consolidations take place somewhere in the 5th thru 16th year and that 2% still remain open until the 20th year
  - Cost of care after consolidation on large claims stands at 56% of total loss in France in 2006.

Endurance
YOUR RISK IS OUR FOCUS

Munich Re study: France

11 Discount rate used to calculate cost of care (calendar years 1998–2006)



Source: Munich Re

The discount rate has been falling steadily in recent years. The point clusters show annual levels calculated in accordance with the legal requirement (60% TME).

Endurance
YOUR RISK IS OUR FOCUS

Let's Go Britain

- Munich Re Study
  - Looked at inflation by type of damage from 1996-2006
  - Analysis of 200 large claims (large defined as >500K GBP at '96 values = 1.4M GBP at 2006 values)
  - Annual severity trend +11% over that period
    - This reflects the impact of one-off events:
      - New Ogden Tables
      - Change in discount rate
    - Excluding those effects severity trend ran at +7%

Endurance
YOUR RISK IS OUR FOCUS

The Gordian Knot

- The number of variables and assumptions that go into the estimation of these large BI claims makes the pricing exercise extremely challenging.
- It is no surprise that reinsurer results have been extremely poor for this LOB.
- The rates of inflation on the loss drivers are difficult to predict.
- Add to that mortality table and discount rate assumptions embedded in the annuity based reserves
- Law changes
- Reopening of claims, social or health insurance offsets (or not),
- Regional issues
- Loss development triangle challenges
- Claims audits are not standard

Some Solutions

- Common databases by market need to be developed
  - Claims databases like in the Munich Re study
  - Some broker presentations include market curves i.e. rate for unlimited coverage excess a range of attachment points
- Reference scales to mitigate inflation
  - Standardized benefits
  - Less litigation
  - France & Belgium & Spain
- Indexation clause
- Strong commutation clause per claimant
  - States when & how large claims are to be commuted
    - X years after consolidation at contractually fixed discount rate using a specific mortality table for example
- Buy Retro

Endurance
YOUR RISK IS OUR FOCUS

Claims Database

- Build a claims portfolio from a variety of submissions in a given jurisdiction (France) or from claims audits
- Capture details such as
  - Victim's DOB
  - DOL
  - Days per year for home care
  - Medical expense
  - Active vs passive care
  - Hourly rate for attendant
  - Economic loss
- Model the claims portfolio based upon
  - Varied inflation assumptions
  - Varied discounting assumptions
  - Varied mortality assumptions
- Or stochastically model a whole claims portfolio
- Quantify impact of assumptions and attempt to project future costs

Reference Tables

- Ogden Tables (UK)
  - Assist in calculation of future economic losses on NPV basis
  - Appropriate multiplier based on gender/life expectancy is applied to "multiplicand" – an annual sum the victim would have earned or is estimated to need
  - Takes into account future inflation and investment earnings
- Bareme Fonctionnel…(France)
  - Medical experts determine the degree of disability from tables
  - Courts then determine the compensation rate for each percentage point of disability
  - There are regional variations
- Baremo (Spain)
  - In PD cases the injury is evaluated on a scale 0-100 points
  - Relevant law indicates the range of points that correspond to an injury
  - Value awarded for each point varies by age, marital status, salary, etc
  - Amounts are annually updated per a retail price index

Indexation aka Stabilization

- Leveraged impact of Trend on excess layers
- Typical for European XOL reinsurance treaty to have indexation clause where Limit & Retention indexed up based on predefined metrics
  - indexation clause will increase the attachment point (referred to as the “priority”) and the limit by the inflation of a defined index between the “base” date and the date of payment to share the impact of inflation on the excess layers
- Three common clauses
  - Full
  - Severe
  - Franchise
- Large BI claims increase at a faster rate than most retail price indexes
- If contractual index too low, reinsurer takes more inflation risk than insurer
- Estimating future inflation always difficult
- Long payment pattern contributes to observed benefit

Endurance
YOUR RISK IS OUR FOCUS

Types of Indexation Clauses

Type of Indexation	Severe	
Threshold:	10.0%	
Annual Increase in Index:	4.0%	
Tail Mean Term:	5	years

Impact of Index:	1.226

Year	Incremental Paid	Full Index	Severe Index	Franchise
1	0.1%	1.020	1.000	1.000
2	0.6%	1.061	1.000	1.000
3	3.6%	1.103	1.003	1.103
4	7.2%	1.147	1.043	1.147
5	18.8%	1.193	1.085	1.193
6	28.1%	1.241	1.128	1.241
7	5.4%	1.290	1.173	1.290
8	4.5%	1.342	1.220	1.342
9	5.9%	1.396	1.269	1.396
10	5.8%	1.451	1.320	1.451
11	5.6%	1.510	1.372	1.510
Ultimate	14.3%	1.837	1.670	1.837

Full = 4% per year
Severe = Full index / (1+threshold) when threshold exceeded
Franchise = Full index when threshold exceeded

Endurance
YOUR RISK IS OUR FOCUS

Pricing for Indexation: Example with Full Indexation

Type of Indexation	Full	
Threshold:	10.0%	
Annual Increase in Index:	4.0%	
Tail Mean Term:	5	years

Impact of Index:	1.348

Year	Incremental Paid	Full Index
1	0.1%	1.020
2	0.6%	1.061
3	3.6%	1.103
4	7.2%	1.147
5	18.8%	1.193
6	28.1%	1.241
7	5.4%	1.290
8	4.5%	1.342
9	5.9%	1.396
10	5.8%	1.451
11	5.6%	1.510
Ultimate	14.3%	1.837

Endurance
YOUR RISK IS OUR FOCUS

Pricing for Indexation

Nominal	IN USD	Indexed	
Layer 1			
Limit:	800,000	Limit:	1,078,363
Retention:	800,000	Retention:	1,078,363
Layer 2			
Limit:	1,600,000	Limit:	2,156,725
Retention:	1,600,000	Retention:	2,156,725
Layer 3			
Limit:	4,800,000	Limit:	6,470,176
Retention:	3,200,000	Retention:	4,313,451
Layer 4			
Limit:	8,000,000	Limit:	10,783,627
Retention:	8,000,000	Retention:	10,783,627
Layer 5			
Limit:	24,000,000	Limit:	32,350,880
Retention:	16,000,000	Retention:	21,567,254
Layer 6			
Limit:	40,000,000	Limit:	53,918,134
Retention:	40,000,000	Retention:	53,918,134

Indexed Limit & Retention using 1.348 Average Index

Endurance
YOUR RISK IS OUR FOCUS

Pricing for Indexation Layer 1

Estimation of Indexation Provision

Impact of Index
-16.73%

Unindexed Reinsurance Layer	800,000	xs	800,000		
Indexed Reinsurance Layer	1,078,363	xs	1,078,363		
Subject Premium			80,308,333		
Non-Cat Loss Cost as a % of SPI			2.48%		
Projected Loss Cost to the Layer			1,994,072		1,660,509
Calculated Average Severity of Losses to the Layer			454,960		608,011
Frequency					
Selected Mean Claim Count			4.38		2.73
Severity					
Reinsurance Limit + Attachment Point				1,600,000	2,156,725
Pareto Probability of Loss < Reins Att Point				99.83%	99.89%
Pareto Probability of Loss < Reins Limit + Att Point				99.94%	99.96%
Limited Expected Value Capped at Reins Attachment Point				14,371	14,753
Limited Expected Value Capped at Reins Limit + Attachment Point				15,163	15,412

Projected Loss Cost to the Layer = SP*loss Cost
Average Severity to the layer = {LEV@(Limit+AP) - LEV@(AP)} / {1 - prob(loss< AP)}
Mean count w/o indexation = Expected Loss Cost/Average Severity
Mean count w/ indexation = Mean count w/o indexation * (1 - prob(loss<AP(w/indexation))/(1 - prob(loss<AP(w/o indexation))
Impact of Index = (Projected Loss to layer with indexation/Projected loss to layer w/o indexation)-1.0

In the example above LEVs are based on ISO severity curves.
There are no real industry curves available for Euro Motor

Endurance
YOUR RISK IS OUR FOCUS

Pricing for Indexation

	Layer 1	Layer 2	Layer 3	Layer 4	Layer 5	Layer 6
Limit in USD	800,000	1,600,000	4,800,000	8,000,000	24,000,000	40,000,000
Retention in USD	800,000	1,600,000	3,200,000	8,000,000	16,000,000	40,000,000
Loss Cost:	2.48%	1.98%	1.59%	0.68%	0.50%	0.23%
Benefit:	-16.7%	-17.8%	-18.4%	-18.6%	-18.8%	-18.8%
reduction to layer burn:	**0.42%**	**0.35%**	**0.29%**	**0.13%**	**0.09%**	**0.04%**

Endurance
YOUR RISK IS OUR FOCUS

Lump Sum vs Annuity in the UK (Partner Re Study; Boghos & Jarrier) with an indexation clause

- Individual case simulation
  - 25 year old
  - 5 years after DOL; to receive annual payment of 130,000 GBP (indexed using the RPI) plus 1M GBP lump sum
  - This is the equivalent of 4.7M GBP lump sum based on the Ogden tables
- What is the loss to the unlimited XS 2M GBP layer under full indexation?
  - Under lump sum loss to layer = 2.27m GBP

Type of Indexation	Full
Annual Increase in Index:	4.4%
Year	Full Index
1	1.022
2	1.067
3	1.114
4	1.163
5	1.214
6	1.267
7	1.323
8	1.381
9	1.442
10	1.505
11	1.572
Ultimate	1.949

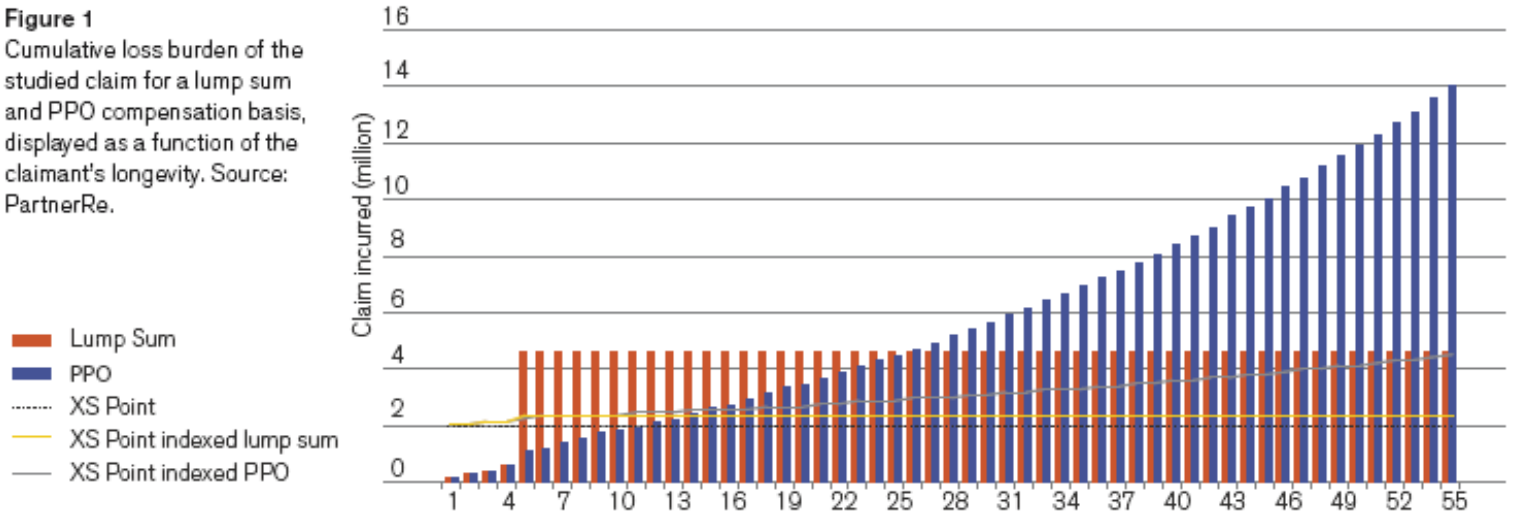
Full Index at 5 yrs:	1.214
Attachment Point:	2,000,000
Attachment Point indexed:	2,427,629
Lump Sum per Ogden Table:	4,700,000
Loss to layer:	2,272,371

Endurance
YOUR RISK IS OUR FOCUS

Lump Sum vs Annuity in the UK (Partner Re Study; Boghos & Jarrier) with an indexation clause

- Individual case simulation
  - 25 year old
  - 5 years after DOL; to receive annual payment of 130,000 GBP (indexed using the RPI) plus 1M GBP lump sum
  - This is the equivalent of 4.7M GBP lump sum based on the Ogden tables
- What is the loss to the unlimited XS 2M GBP layer under full indexation?
  - Under annuity (PPO) depends on longevity

Figure 1
Cumulative loss burden of the studied claim for a lump sum and PPO compensation basis, displayed as a function of the claimant's longevity. Source: PartnerRe.



Endurance
YOUR RISK IS OUR FOCUS

Exposure Curves (lack thereof)

- Exposure Rating
  - Don't have decent exposure curves and NEVER get Gross Loss data
  - Thinking about Frequency/Severity type of approach
    - Actuary makes an XS frequency pick based on Experience
    - Severity curves based on submission/market data – development an issue
      - Or market pricing curve
    - LogNormal, 2 Parameter Pareto, etc.

European Motor – After all that, why bother?

- Ground Up Frequency continues downward trend
  - Safer vehicles
  - Introduction of safety cameras in France
- Hardened reinsurance rates
  - Seeing this in UK and France
  - Reinsurers are finally pricing in future cost of care
- Reference Tables more prevalent
- Commutation provisions & Indexation clauses
- May need to get on a few Motor deals to see other profitable business
  - Program participation is big