# On some actuarial research problems in life and non-life insurance

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## Estimating portfolio's mortality experience
**joint work with Spedicato, G.A. - Unipol Group**

### Motivation

- Mortality rates are key drivers of life insurance products cash flows
- Best estimate of the portfolio's mortality stems from the collection of policyholder's risk factors combinations, as gender, smoker status, the socio-economic status, etc.
- Insurance companies whose portfolio mortality experience is limited must refer to industry mortality tables or at country level
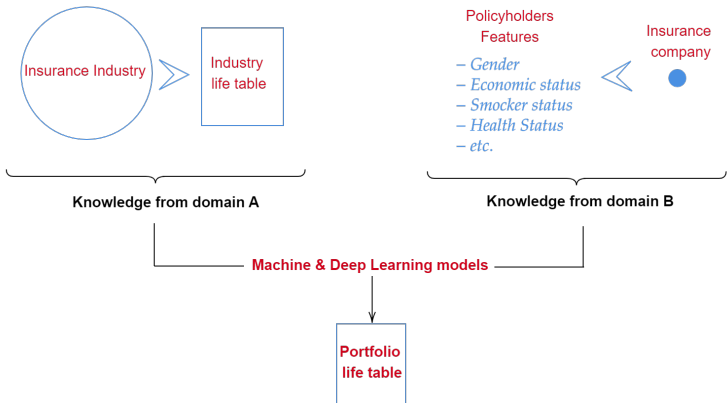  - Wrong: there exists a basis risk!

### Goal

Infer portfolio-based life table by the knowledge of market (industry) life table

## Proposal

Creation of a transfer-learning-based mortality relation model

# Pricing Non-Life multi-peril insurance contracts

**joint work with Caccone M., Spedicato, G.A. - Unipol Group**

## Motivation

- Usually, Non-Life insurance contracts provide multiple types of coverage or perils, for instance:
  - Automobile insurance
  - Multi-peril homeowner insurance
  - Medical insurance

- A common practice for pricing multi-peril policies is to perform independent pricing analysis on each peril
  - Wrong: poor expected loss approximation!

## Goal

Determine overall premium incorporating perils dependence structure through copulas.

# Pricing Non-Life multi-peril insurance contracts

**joint work with Caccone, M. and Spedicato, G.A. - Unipol Group**

## Proposal

- Application to a real medical costs data set related to a multi-peril health insurance contract
- Perils marginally modelled via Tweedie regression model
- Modeling perils dependence Pair Copula Construction method through Regular-vines to built the joint claims distribution

## Results

Coherent premium and policy limits definition, both on aggregated and individual basis, incorporating the dependence between couple of perils.

# Retirement capital accumulation under jumpy markets and longevity risk

**joint work with Mancinelli, D. and Oliva, I. - Memotef**

## Motivation

- Pension schemes cash flows are exposed to both financial and human lifespan dynamics
- Contributes are invested in financial markets to achieve a retirement capital
  - Investment risk (and others)!
- Pension benefits are paid up to reteree death
  - Longevity risk!

## Goal

Establish a modeling framework to guarantee the retirement capital process under the joint action of market turmoils and human longevity

# Retirement capital accumulation under jumpy markets and longevity risk

**joint work with Mancinelli, D. and Oliva, I. - Memotef**

## Proposal

Continuous time modeling of retirement capital accumulation process in presence of market jumps (in price) and longevity risk using the Constant Proportion Portfolio Insurance strategy.
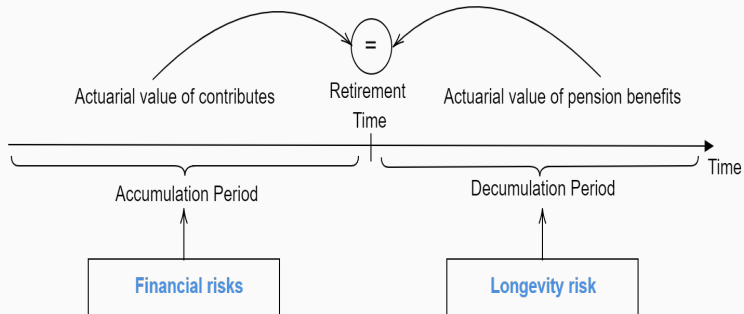
# Enjoy actuarial research with actuaries!

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