

## 33<sup>rd</sup> ANNUAL GIRO CONVENTION

Hilton Vienna Hotel, Am Stadtpark

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Can one use the same model for pricing,  
budgeting and reserving ?

Jens Perch Nielsen  
Festina Lente and Royal&SunAlliance

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## Pricing

The price is estimated from modern  
regression theory using GLM models  
and GAM models.

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## Pricing 2

An increasing number of covariates are being used e.g. GIS and credit scoring.

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## Reserving

Reserving is primarily based on triangle data : aggregated data grouped according to calendar year and duration.

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Can one use the same model for pricing, budgeting and reserving ?

Both are regression models and based on the same data.

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## Capital and volatility

The level of volatility determines the level of capital.

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## Capital and volatility 2

Pricing has so far not been taking volatility into account. Capital considerations on policy level is therefore difficult.

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## Capital and volatility 3

Volatility considerations have started big time when it comes to reserving

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## Capital and volatility 4

Capital allocation is therefore typically based on aggregated data.

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## The Question!

Is it possible to combine the sophisticated regression techniques known from pricing with the volatility considerations known from reserving?

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## Answer to the question.

Yes, this is indeed possible !

Literature combining regression models with a time series is beginning to appear.

(See paper with Bent Nielsen on his web page at Nuffield College, Oxford).

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Consider the typical regression model

$$Y_n = g(X_n) + \epsilon_n$$

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.. and with latent time series

$$Y_n = g(X_n) + f_t + \epsilon_n$$

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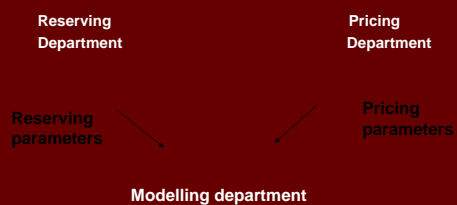
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Organisational consequences



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### Answer to the question.

It is possible to combine reserving and pricing.  
It will cut costs and provide a consistent framework for decisions.  
It does require further research !

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Can one use the same model for pricing, budgeting and reserving ?

Yes, in the near future!

Jens Perch Nielsen  
Festina Lente and Royal&SunAlliance

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