



How to manage a general insurance portfolio for profit with limited actuarial resources

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Outline



- Introduction Posthuma Partners
- Real world problems & issues
- Solution: Integral Financial Modelling (IFM™)
- IFM™ output
- Local partnership & special offer



Introduction Posthuma Partners

- Established in 1997
- Dutch actuarial (boardroom) consultancy and software company
- IFM™: a 'need-to-have' tool for control and management of non-life portfolios: claims reserves, pricing, validation of data and Risk Based Capital compliance
- IFM™ is internationally recognized and scientifically validated



Posthuma Partners



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Real world problems & issues

- Actuarial staff, shortage or surplus
- Correct data, validation
- Improving portfolio profitability, insight in claims reserves
- Pricing, scenarios
- Risk Based Capital compliance



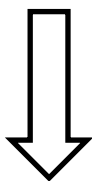
...and of course (issues continued)

- Reinsurance
- Claims levels – both in terms of cash out and reserving – for the next few years under present policy
- Management information





**How to manage a portfolio for profit
– as an actuary**



Integral Financial Modelling (IFM™)



Limitations of Chain Ladder or other traditional methods

while there is no relation with (future) exposure and it isn't a stochastic model, either

- it can't be used for pricing
- it can't be properly used as a management tool
- there is no Risk Adjusted Loss or Risk Based Capital targeting possible





Idea behind IFM™ I

Using this software one individual can

- Manage the portfolio for profit
- Comply easily to all Risk Based Capital requirements
- Control data
- Tackle pricing issues and, finally
- Provide relevant management info





Idea behind IFM™ II

How:

With a stochastic model for future cash flow of the payments due plus new premiums

Input:

- Loss triangles
- Exposure

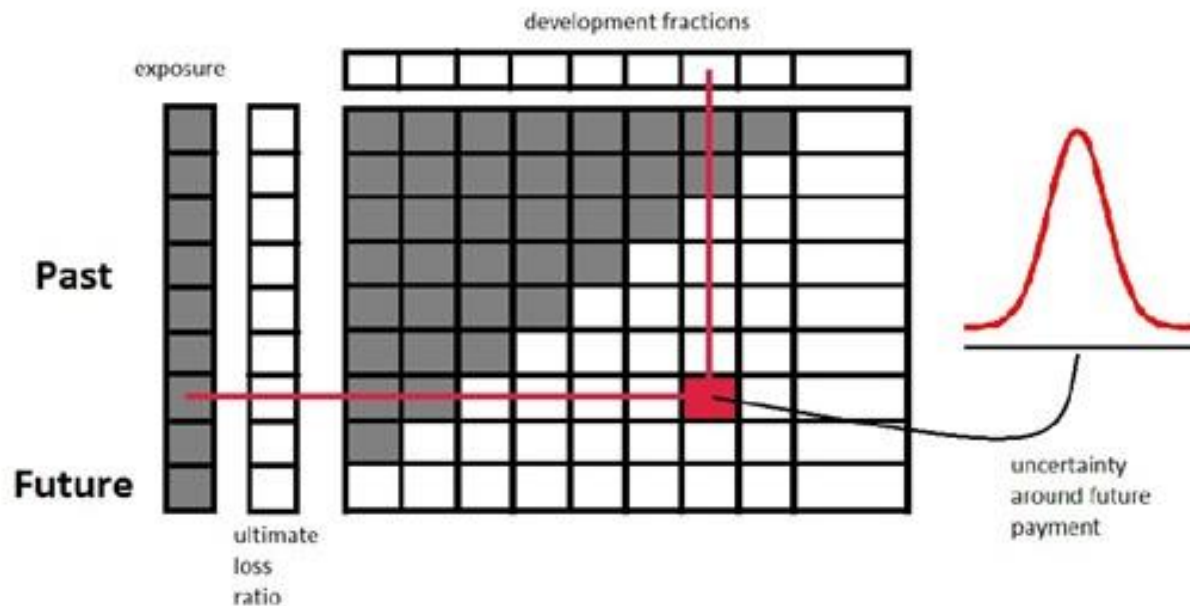
Output:

A robust and precise model of your portfolio. Less effort, more result



Theory in short I

Modeling the incremental runoff triangles as a *cross-section* table (including future), related to the exposure from the past *plus* the exposure of new premiums



Theory in short II

Efficient modeling by:

- (*Rows*) choose a settlement duration function (with 2 or more parameters)
- (*Columns*) choose a loss-ratio function (with 2 or more parameters) – with *a stochastic assumption*
- *Incremental* cells (approximately) normal distributed with an average and a variance depending on the product of *Exposure, Loss ratio and fraction of settlement*

That's it!





Recognition

Mathematics 'under the hood' are processed to user-friendly software IFM™ (since 2001)

IFM™

- Internationally recognized: ASTIN, CAS CLRS, EAAC; also AAC Bangkok November 2015
- Scientifically validated: Dutch universities of Leiden, Nijmegen & Amsterdam
- Several actuarial papers:
www.posthuma-partners.nl ; in  and 



IFM™ track-record



achmea

AEGON

AIG



Bovemij

cnv



DE FRIESLAND
ZORGVERZEKERAAR

de Goudse
verzekeringen

DEKRA
On the safe side.

delta lloyd

eurocross
assistance

HDI
GERLING

ING

IEB
schadeservices

oom VERZEKERINGEN

REAAL

scalepoint
Passion for Claims



SRK
RECHTSBIJSTAND

SUR

unigarant
verzekeringen

UNIVÉ
VERZEKERINGEN

Waar
In het hart van de gezondheidszorg.

Waarborgfonds
Motorverkeer

ZURICH



Output



Dashboard – IFM™ in practice

1. Model specification

File Import Connection Window Help

Single Beta Incurred Development Duration

180 max possible duration

Single Weibull Paid Development Duration

Constant, 1 regime change

Jan-09 regime change

Development duration: variance as expected value

Bayesian model

12 loss aggregate incurred

12 development aggregate incurred

12 loss aggregate paid

12 development aggregate paid

group rectangular

group incurred accounting >

group payments accounting >

group tail incurred

group tail paid

Jan-13 start aggregation keep last period together

Analyze two triangles

Show Advanced Settings

2. Model saving

triangle creation date Jan-13 Certified

use other current date Triangles C

Included/Loss

correlatie portefeuille

correlatie portefeuille

portfolio

- LOB1
- LOB1_1998
- LOB1_2000
- LOB1_2003
- LOB1_inc_futures
- Paid and Incurred 1
- Paid and Incurred 2

3. Signal table

number of observations
upper tail
degrees of freedom
prediction uncertainty
stochastic uncertainty
mean of residuals
development duration fit
hessian
loss ratio
extreme uncertainty

variance: 32% stochastic, 68% estimation
degrees of freedom: 98.0
minus log likelihood: 1565.66
number of iterations: 50

economic interpretation

current average loss ratio	36
previous average loss ratio	38
standard deviation of current loss ratio	01
50% of incurred/loss occurs within month	15
90% of incurred/loss occurs within month	56
99% of incurred/loss occurs within month	126

4. Parameters including interpretation

loss period	expected value	80% quantile	fair allocation of total quantile	IBNR
totals	65,523,636	2,227,768	1,693,538	282,757
2003	1,179,048	2,227,768	1,693,538	282,757
2004	1,592,875	2,680,286	2,126,347	212,121
2005	2,276,780	3,458,039	2,856,292	65,053
2006	4,576,572	6,372,513	5,457,640	(665,304)
2007	4,096,359	5,483,000	4,776,629	(241,401)
2008	5,443,167	6,963,150	6,188,854	(427,791)
2009	5,762,362	7,097,457	6,417,345	(55,921)
2010	8,116,793	9,540,673	8,915,332	(172,826)
2011	11,329,348	12,836,777	12,068,875	317,619
2012	21,150,332	23,042,466	22,078,692	4,206,458

5. Standardized errors

Total	Incurred	Paid	1	13	25	37	49	61	73	85	97	109	1	13	25	37	49	61	73	85	97	109		
mean	14	-16	11	2003	2.09	-30	2.13	-84	-60	69	-78	-1.08	-40	-43	50	-84	-1.00	-41	10	54	156	-19	1.25	42
std. dev.	99	1.00	99	2004	54	61	-15	1.44	-65	37	236	1.95	.41	33	-1.87	-99	05	63	2.11	2.00	1.17	1.46		
skewness	-26	-42	-09	2005	62	13	32	05	-1.81	-1.64	-1.09	83												
kurtosis	2.55	2.85	2.26	2006	39	1.91	1.78	-89	-42	1.24	64													
				2007	44	1.12	90	-1.13	27	56	64													
				2008	1.86	1.23	-18	1.37	-16															
				2009	1.11	-1.10	70	02																
				2010	63	-02	21																	
				2011	56	-77																		
				2012	09																			

6. Database content

SQL Server PPSQL01\SQL2005\IFM5_Script

- SV Verstekking
- Categories
- Example
- Line of Business 1
- XYZ Insurance

7. Triangle overview

12 months aggregate January start month

12 months aggregate

80% probability

include future

80% probability

0% interest Yield file

January start month

0% cost of capital Show C

restrict runoff

8. Actuarial screen

12 months aggregate

January start month

9. Specification of actuarial projections

Cash Flow

Ultimate Loss Prediction

Actuarial Loss Provision

IFRS

Completed Table

Loss Reconciliation

Solvency

12 months aggregate

80% probability

include future

80% probability

0% interest Yield file

January start month

0% cost of capital Show C

restrict runoff

10. Data triangles

LOB1_2003

exposure (min)

Incurred/Loss (min)

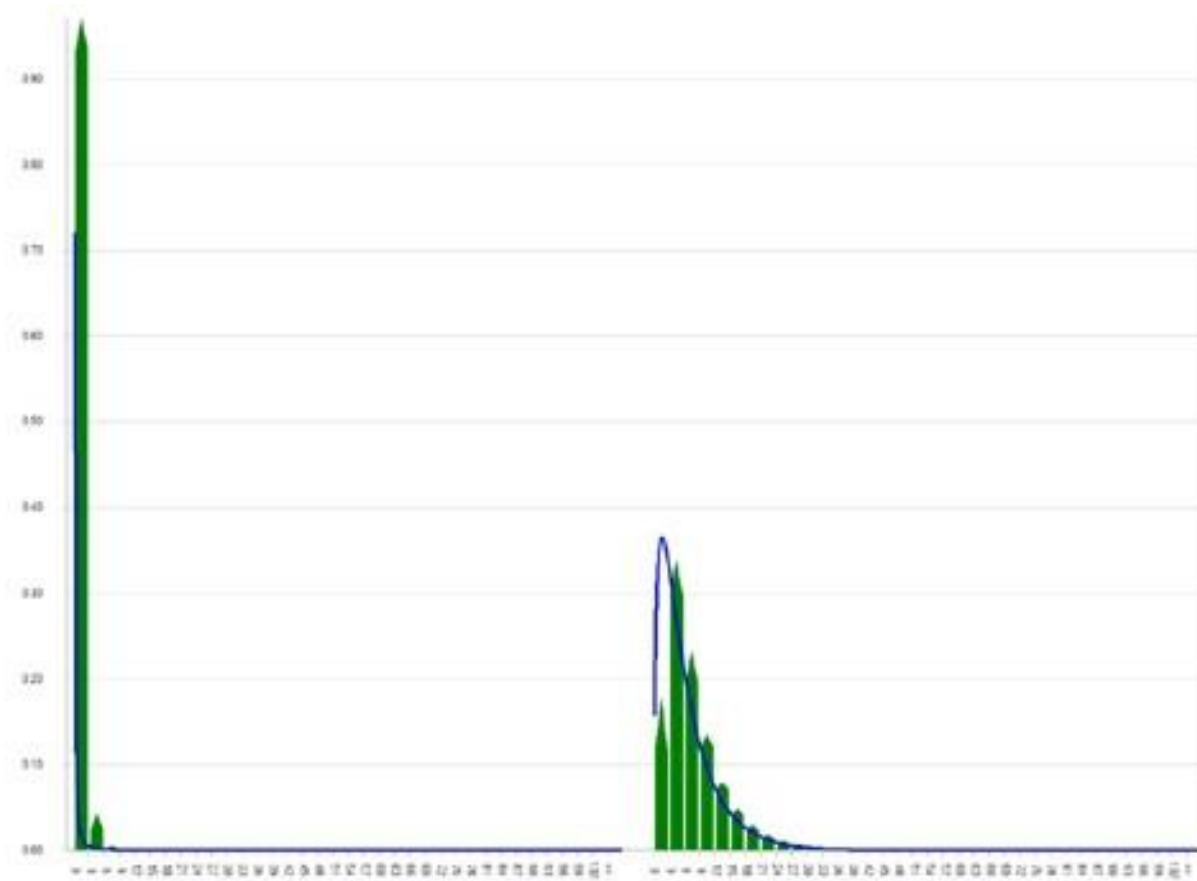
exposure	1	13	25	37	49	61	73	85	97	109	1	13	25	37	49	61	73	85	97	109		
2003	100.0	43.9	2.27	(2.41)	(81)	(48)	29	(42)	(50)	(19)	(1.8)	17.6	9.91	3.48	2.14	1.63	1.40	1.66	66	1.06	53	1.41
2004	100.0	35.9	4.86	07	1.00	34	15	(1.12)	54	13		17.2	8.56	3.36	2.40	1.92	2.34	1.87	1.15	1.13		1.91
2005	100.0	36.2	3.81	22	(06)	(1.19)	(92)	(55)	31			16.0	8.55	2.97	2.05	1.47	1.67	1.33	92			2.79
2006	100.0	63.7	7.32	1.60	(36)	(39)	56	22				15.1	9.93	4.98	2.07	2.22	1.42	1.27				6.12
2007	100.0	35.0	5.88	80	(98)	09	24					16.1	10.2	4.01	2.32	2.06	1.24					5.02
2008	100.0	40.8	5.48	(45)	34	(23)						18.2	11.0	5.21	2.92	2.56						6.62
2009	100.0	37.7	1.05	59	(08)							17.7	9.84	3.32	1.90							6.47
2010	100.0	34.8	3.38	13								17.0	8.83	3.52								8.99
2011	100.0	95.1	2.03									14.6	10.7									11.75
2012	100.0	32.8										14.7										17.67

11. Graph time series

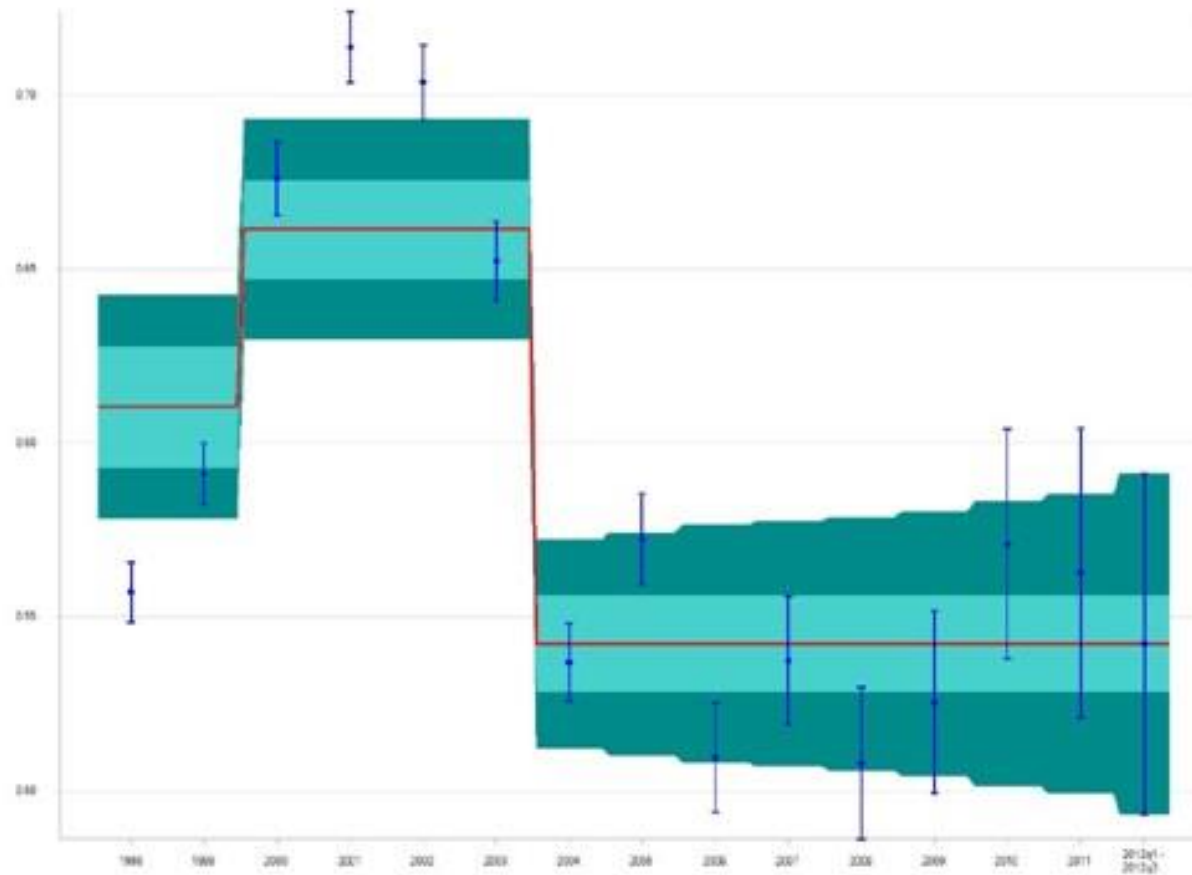
12. Graph development duration



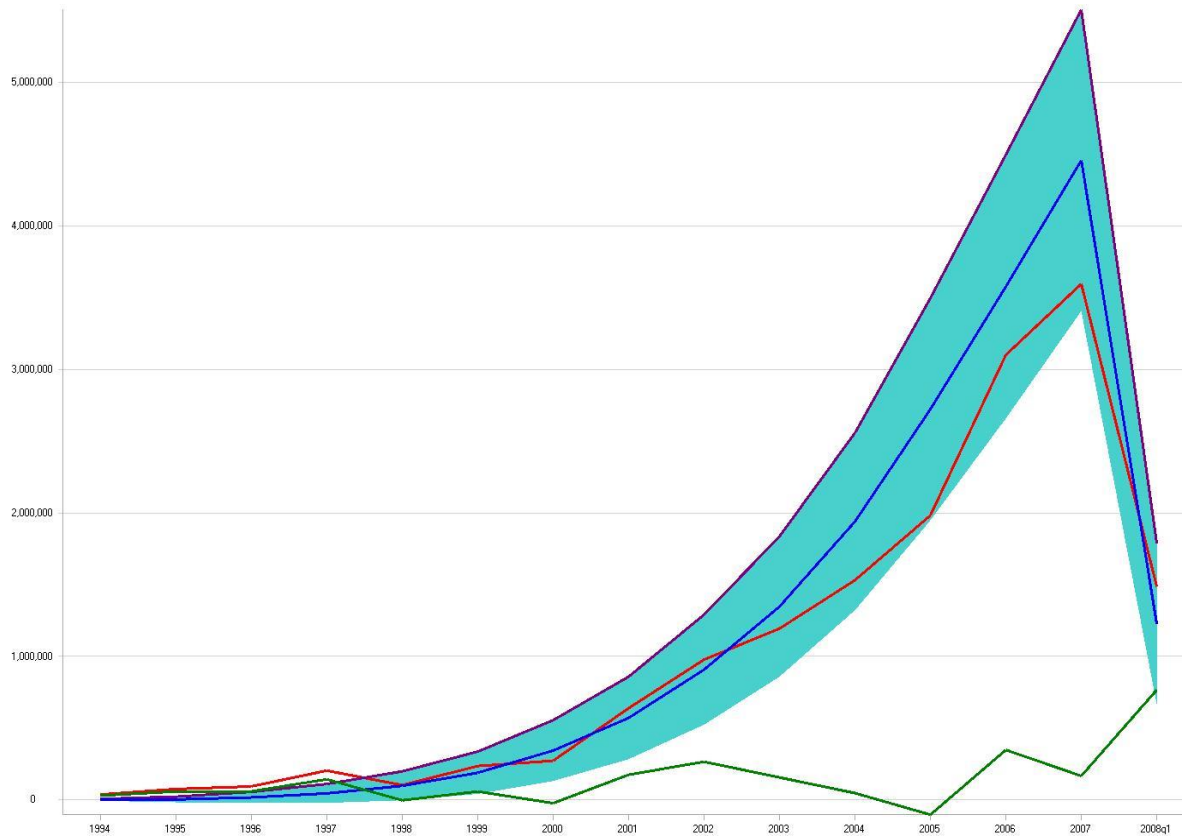
IFM™ output I Development function - example



IFM™ output II Ultimate loss ratio - example



IFM™ output III Reliability check - example



IFM™ output IV – mgt. example

IFM - Management Dashboard for non-life insurance - 2014 (example)

	Q1	Q2	Q3	Q4
Premium Income Non-Life	PM	PM	PM	PM
Risk Adjusted Loss Provision (S II)	12,257	12,204	12,300	12,289
Balance Sheet Loss Provision	PM	PM	PM	PM
Difference	Example	Example ¹⁾	Example	Example
Development of loss ratios				
-accident	30.0	30.0	30.1	30.0
-business property	27.5	27.5	27.4	27.6
-casco	46.6	47.5	47.1	47.3
-household	32.3	33.4	34.0	32.0
-MTPL	67.9 ²⁾	93.6 ²⁾	95.0 ²⁾	72.2 ²⁾
TOTAL	38.1	42.2	43.0	41.2
Trends in Risk-premium				
-accident	29.9	31.5	31.4	31.4
-business property	29.0	28.5	28.5	28.5
-casco	46.9	48.2	48.1	48.2
-household	32.3	34.0	34.2	33.5
-MTPL	68.6 ²⁾	93.3 ²⁾	94.0 ²⁾	77.0 ²⁾
TOTAL	38.1	42.8	42.8	41.8
Volatility of reserves				
	³⁾	³⁾		³⁾
Claimsfrequency				
-accident	PM	PM	PM	PM
-business property	PM	PM	PM	PM
-casco	PM	PM	PM	PM
-household	PM	PM	PM	PM
-MTPL	PM	PM	PM	PM
TOTAL	PM	PM	PM	PM

Remarks:

- 1) IFM produces a validated Solvency II - outcome, difference is > 3%
- 2) Based on the Q1-figures, IFM predicted a breach of the underlying loss ratio / risk premium trend, already
Measures to be discussed
- 3) The process of reserving for household needs further investigation, volatility is more than 30%



IFM™ output V- loss provision example

Analysis of the 2 loss triangles provided (Malaysian Ringgit 1,000)		Line of Business (Lob)		Sum (no diversification)	
		Short Tail 12/31/2014	Long Tail 12/31/2014	TOTAL	
1	Loss Provision Run Off				
	IFM best estimate (nominal cash flow)	(1)	15,011	326,502	341,514
	Time value of best estimate (3.5%)	(2)	(646)	(26,960)	(27,606)
	Margin Cost of Capital +9%	(3)	5,104	43,889	48,993
	Provision RAL (Risk Adjusted Loss)	(4) = (1)+(2)+(3)	19,469	343,431	362,900
	Case Reserves Available	(5)	41,454	196,885	238,338
IBNR needed for Run Off	(6) = (5)-(4)	(21,984)	146,546	124,562	
	IFM advice for loss provision	OK	Too low		



IFM™ output VI – risk premium, cashflow example

Analysis of the 2 loss triangles provided (continued)		Line of Business (Lob)		Sum	
		Short Tail	Long Tail	(no diversification)	
(Malaysian Ringgit 1,000)		12/31/2014		TOTAL	
2	Risk inclusive 12-month future premium				
	Provision RAL	(7)	37,228	499,398	536,626
	Risk premium 12 months on RAL basis	(8) = (7)-(4)	17,758	155,967	173,725
	Assumed 12 months future net premium	(9)	17,939	123,072	141,011
	(8) as percentage of (9)		99.0	126.7	123.2
	Risk Premium per policy needed		18.91	166.12	185.04
IFM advice for net premium (risk premium)		OK	Too low		
3	Diminishing cash flow after accounting year		not signalled	2018	2018
	best estimate ultimate loss new year exposure	(10)	14,835	154,120	168,955
	(10) as percentage of (8)		83.5	98.8	97.3
	IFM advice for diminishing cash flow		OK	Attention	
4	Installments (% payments after x months)				
	50% payments		19.7	40.4	39.5
	90% payments		40.6	88.3	86.2
	99% payments		91.4	95.2	95.1



Local partnership & Special offer



Team Excellence Consultancy Company Limited



Special offer (in coordination with Team Excellence)

- Free installation of software & reference manual
- Free coaching 'on the job' to have a quick start
- In-house workshop for THB 5,000
- Subscription fee/licenses: first year from THB 300,000 to THB 900,000 to be in control of your portfolio and data on a quarterly basis



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