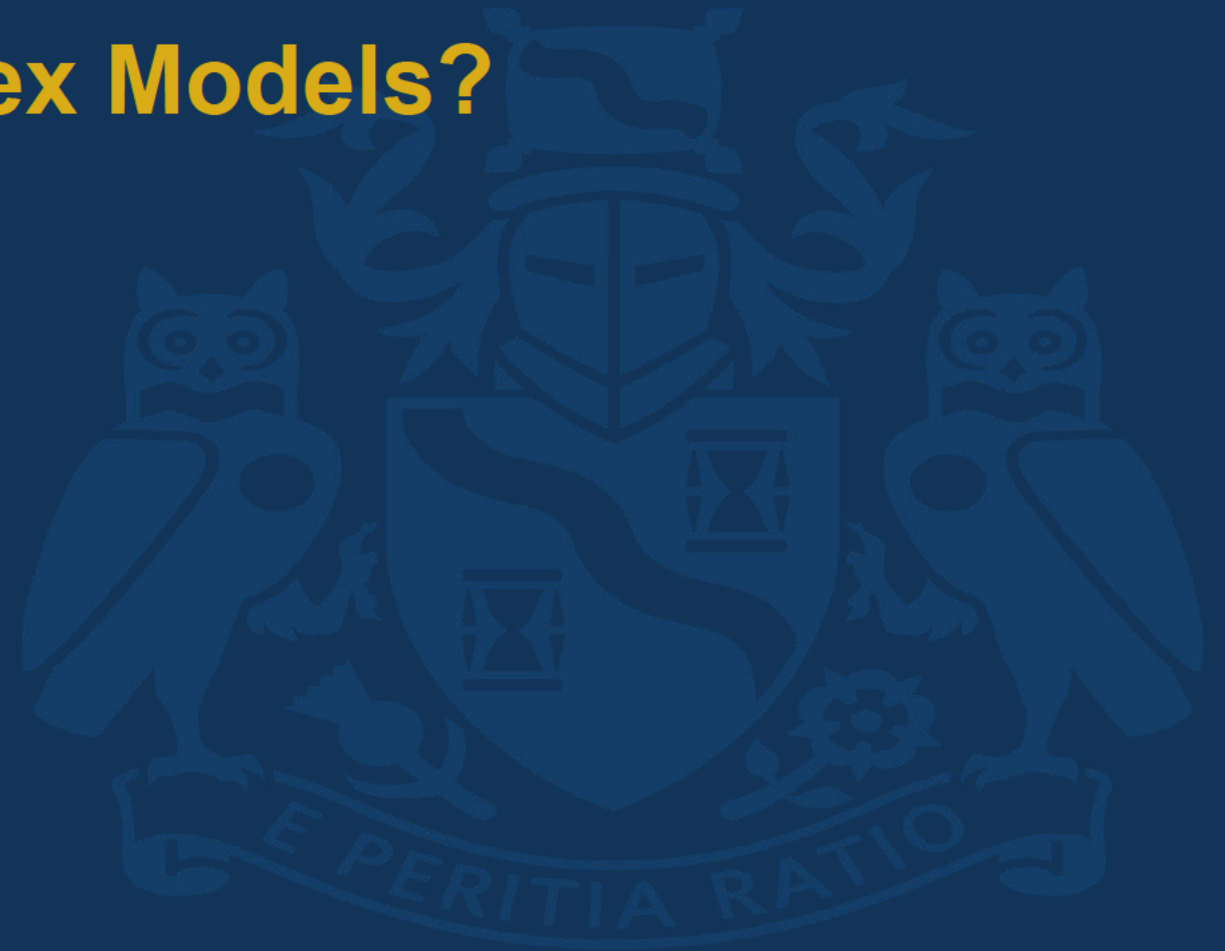




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Complex Reality, Complex Models?

James Norman



Simple vs Complex Models

Economics

ARIMA

vs.

Large Scale
Macroeconomic Models

Asset Allocation

1/N

vs.

Markowitz
Portfolios

Seismology

Guttenberg-Richter

vs.

Characteristic
Earthquake Model

FX Rates

Random Walk

vs.

Monetary Models

Banking

Leverage Ratio

vs.

Risk Weighted Capital

Demographics

Extrapolation

vs.

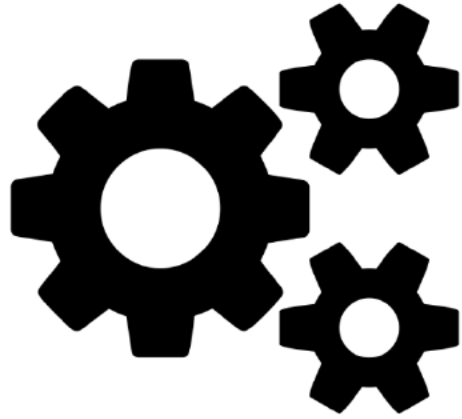
Census Bureau
Model

**Complex models have often performed
poorly compared to simpler models**



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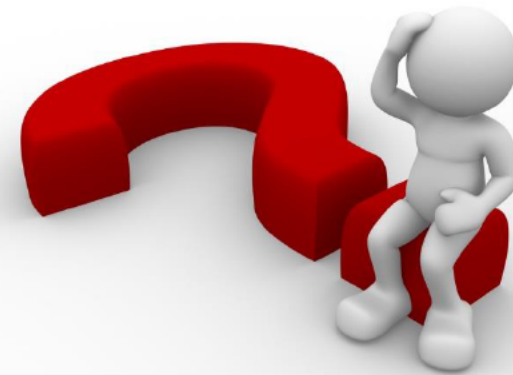
What is a Complex Model?



Complex
Many parts

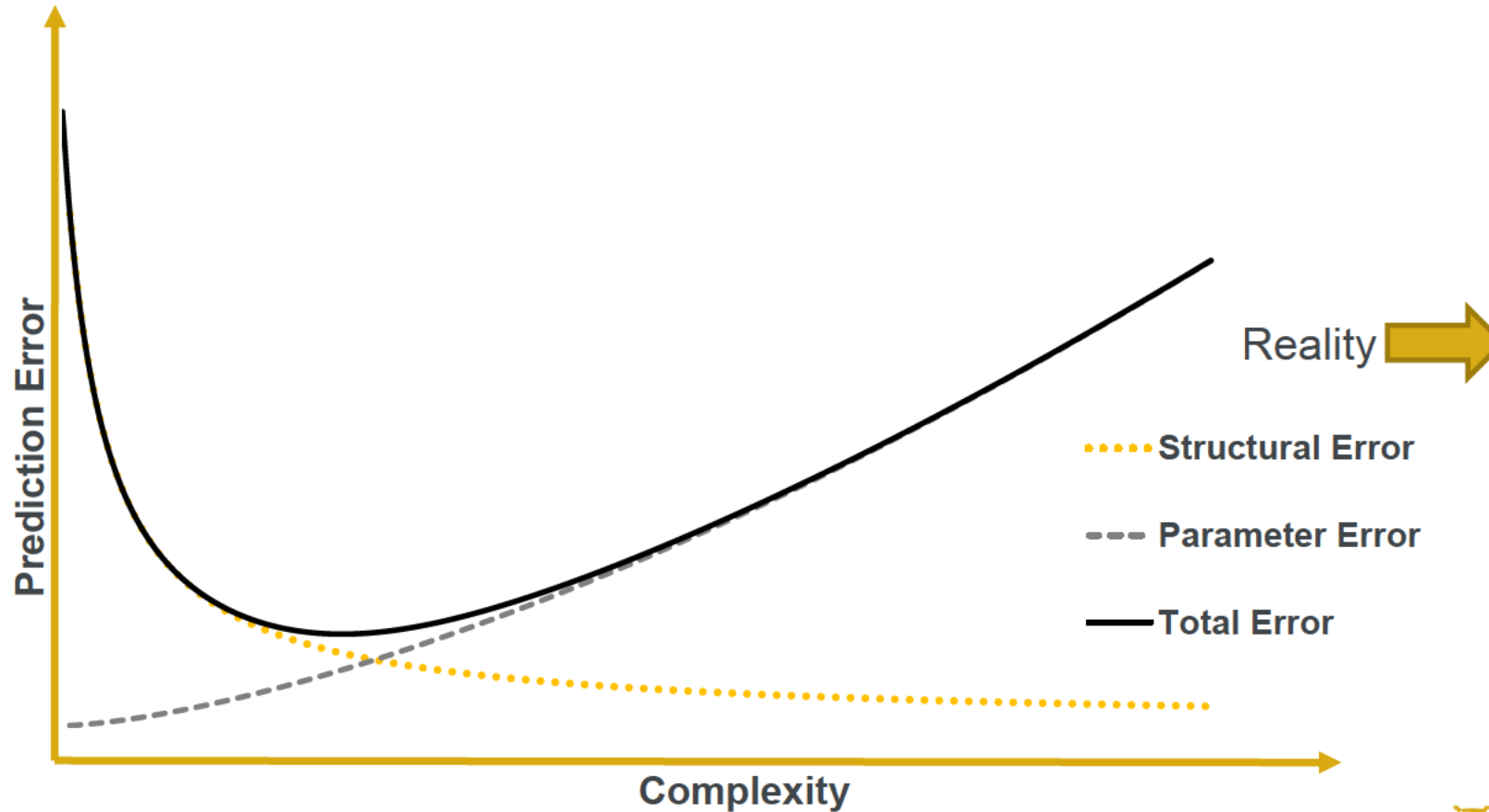
Vs.

Complicated
Difficult to understand



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Balancing Simplicity and Complexity



Structural Error – Model structure does not reflect reality
Parameter Error – Model parameters not estimated correctly



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Other Considerations

Greater clarity

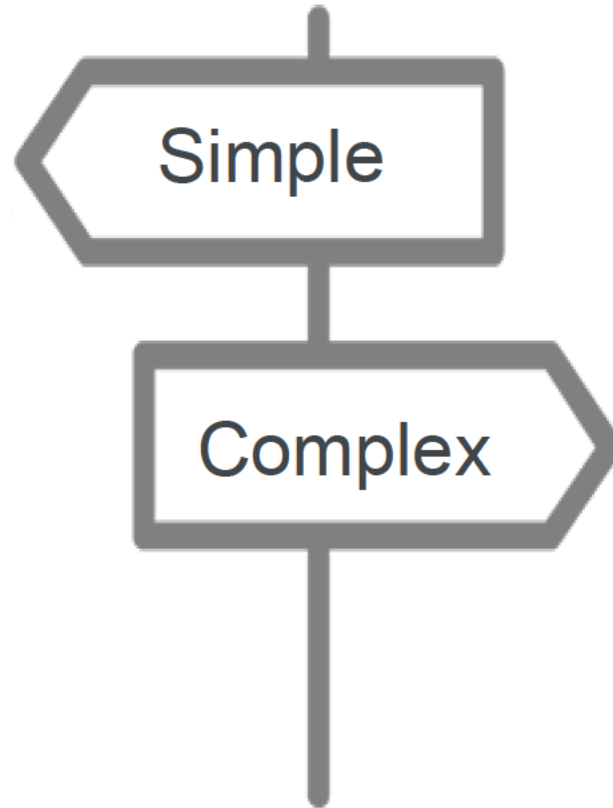
Easier to test

More robust

Faster answers

Less work to operate

Multiple models?



One model for all purposes

Business buy-in

More detail

More insight?

Higher risk sensitivity?

More assumptions



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Complexity in Banking Internal Models

“With thousands of parameters calibrated from short samples, these models are unlikely to be robust for many decades, perhaps centuries, to come. It is close to impossible to tell whether results from them are prudent.”

“The Dog and The Frisbee”, Andrew G Haldane, Executive Director, Financial Stability and member of the Financial Policy Committee and Vasileios Madouros, Economist, Bank of England



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Complexity in GI Capital Models

Risk Area	Number of Parameters (Approx)
Non-Cat Underwriting Risk	300
Cat Underwriting Risk	??
Reserve Risk	1,000
Credit Risk	50
Market Risk	1,000
Op Risk	500
Dependencies	1,000
SII Balance Sheet	2,000
Total (excl Cat)	5,850

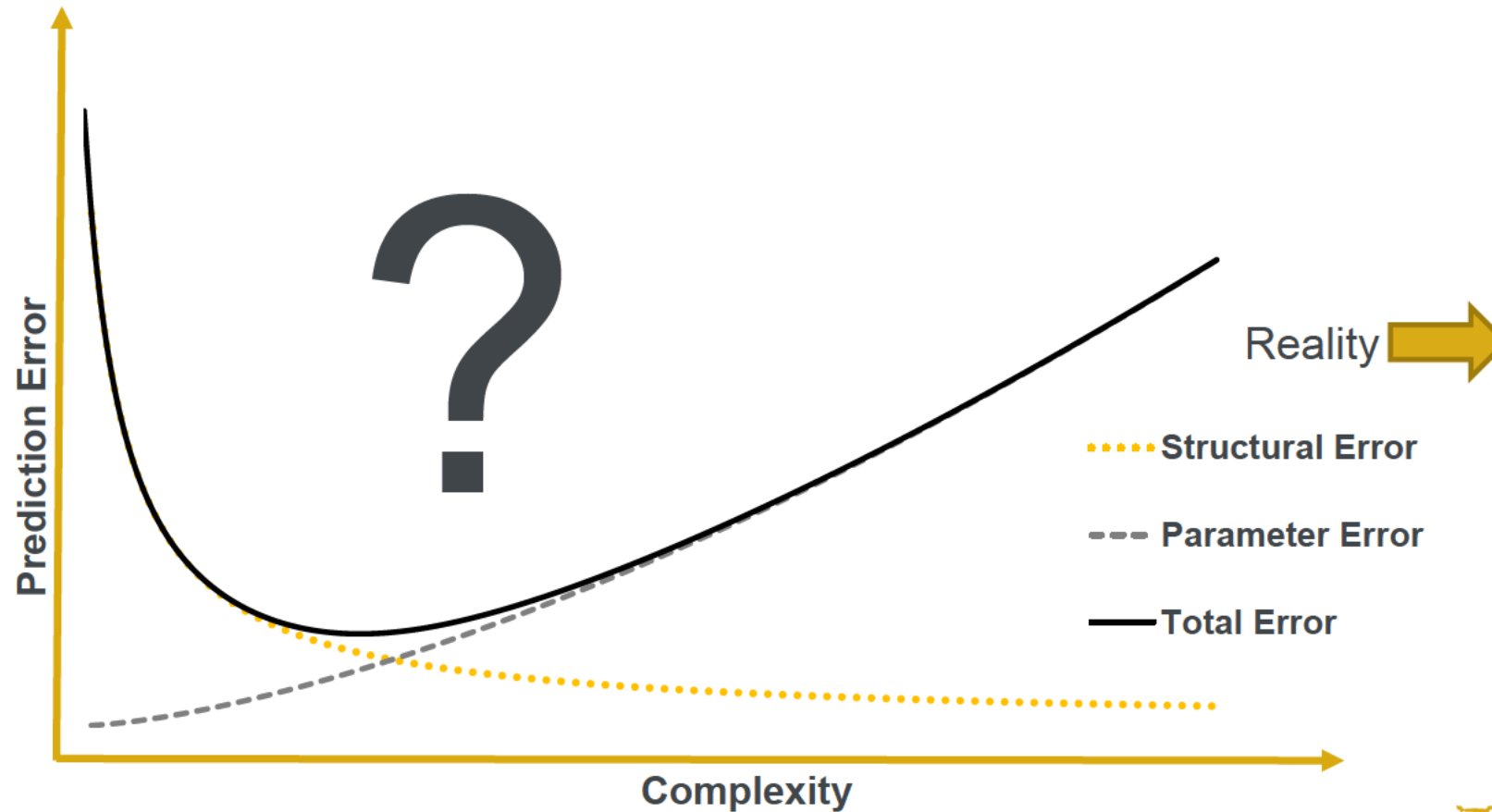
Based on relatively common GI capital model methodologies, assuming

- 30 lines of business
- 3 currencies
- 10 prior years
- 30 op risks
- etc

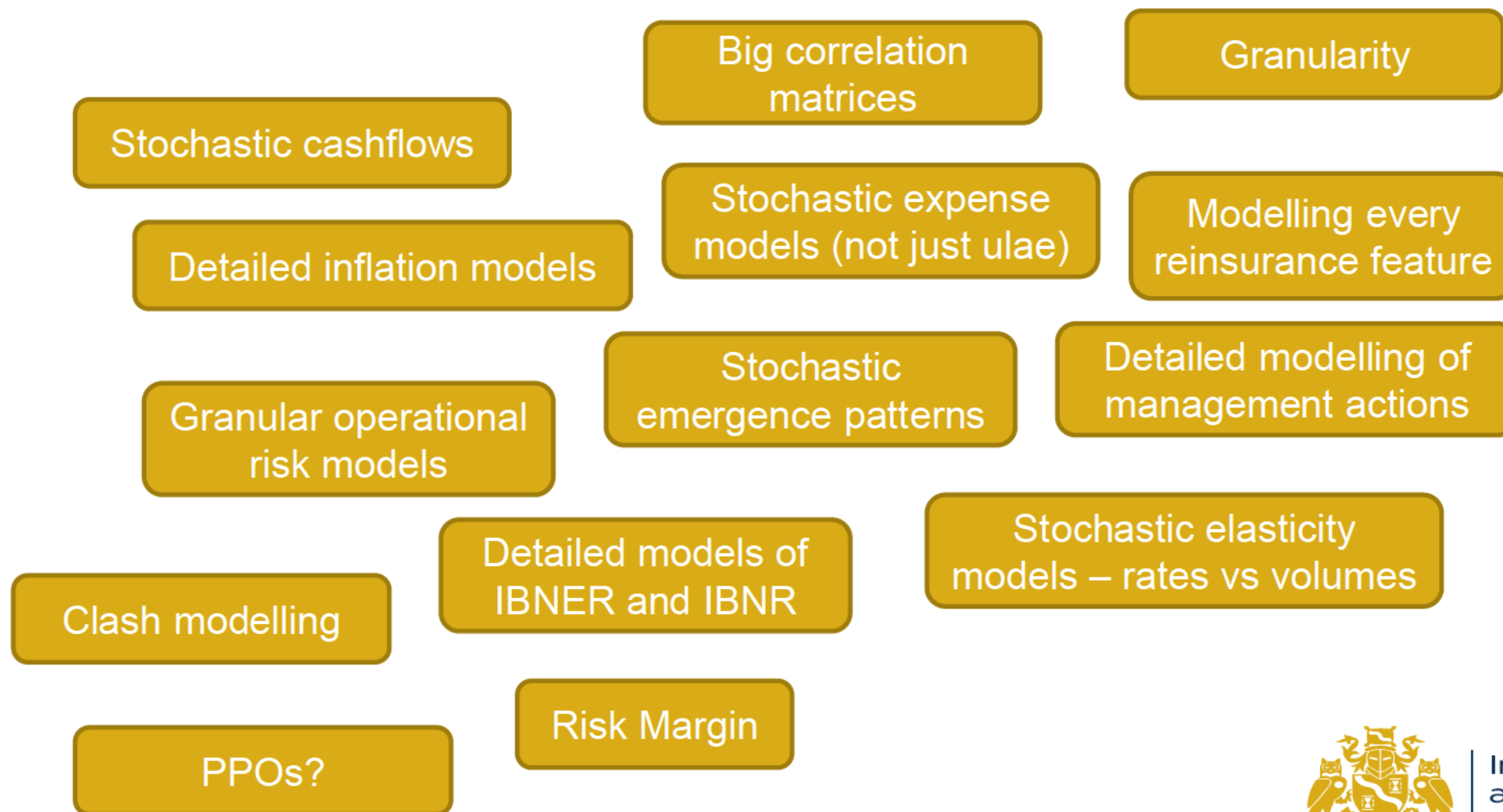


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Where Are We Now?

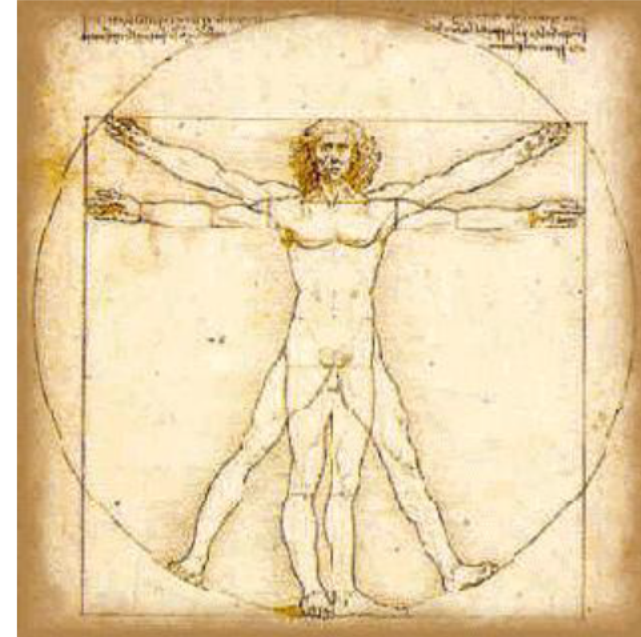


Possible Areas for Simplification



Getting the Right Balance

- Be aware of complexity
- Think more “top-down”
- Start simple by default
- Consider parameter uncertainty
- Try simple models alongside complex ones
- Simplifying (well) is hard



“Simplicity is the ultimate sophistication”

Leonardo Da Vinci



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Questions



Comments

Expressions of individual views by members of the Institute and Faculty of Actuaries and its staff are encouraged.

The views expressed in this presentation are those of the presenter.



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