

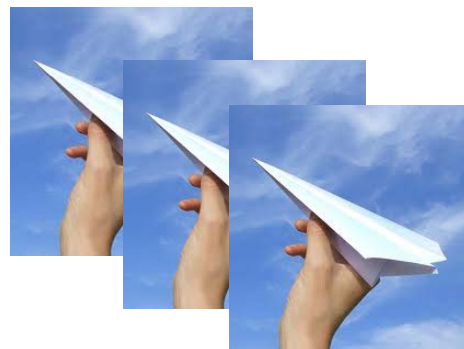
General insurance pricing seminar  
Sarah Vaughan

## Time is Money Are you rich?

21 June 2011

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### Red Arrows and Paper Planes



- Accuracy at speed

OR *appropriate* level of accuracy?

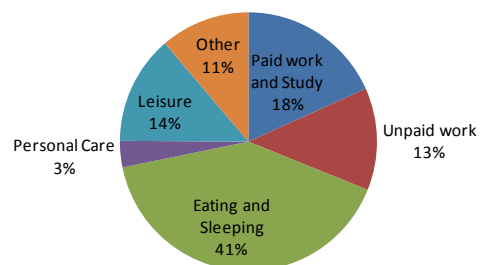
There can be as much value in the blink of an eye as in months of rational analysis.  
**Malcolm Gladwell, *Blink: The Power of Thinking Without Thinking*, 2005**

## What this presentation is not



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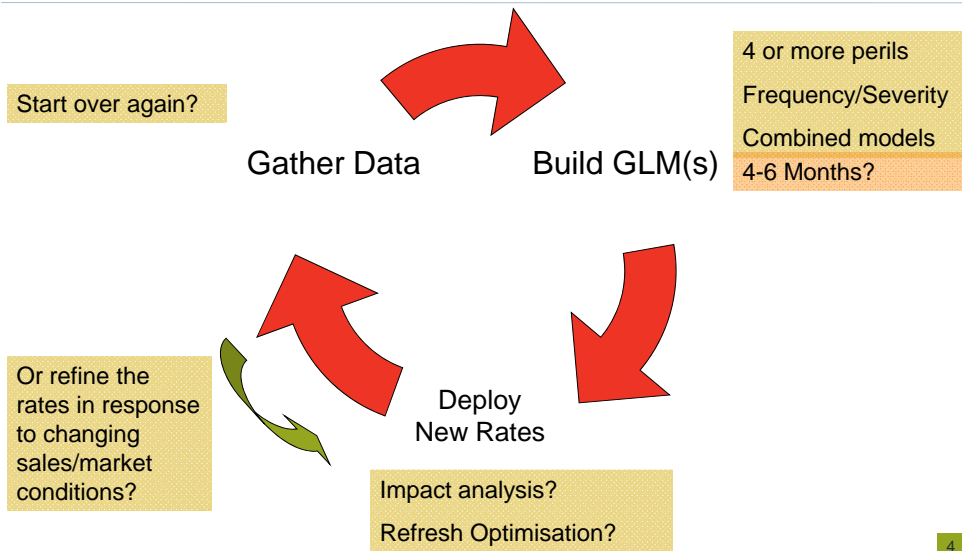
## So what do we spend our time on?



Source: [http://www.economist.com/blogs/dailychart/2011/04/time\\_use](http://www.economist.com/blogs/dailychart/2011/04/time_use)

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## A Traditional Approach to Pricing



## A Different Approach to Pricing?

- Actuaries have traditionally focussed on model building
- Is the role of the actuary to provide the most accurate answer that available data and modelling techniques are able to calculate?
  - Or advice and guidance that incrementally improves the bottom line?
- Just because we have the data available to build an accurate model, doesn't mean it's worth building...

## Money to Burn?

'Agents should allocate time according to cost-benefit tradeoffs. Such tradeoffs should also influence the amount of time that agents allocate to *decision-making itself*. [...]

...agents should allocate **more decision time to choices between options of similar expected utility** than to choices between options of dissimilar expected utility. [...]..if an agent's estimate of the value of the best option is close to her estimate of the next best alternative, then it is optimal to take more time to refine her estimates since this extra time has a good chance of leading her to change her choice. In contrast, if an agent has a noisy estimate of the value of an option but the option almost surely dominates its alternatives, then it is not worth taking the time to refine her estimates, because **additional thinking is unlikely to change her choice.**'

Source: 'The allocation of time in decision-making', <http://www.wjh.harvard.edu/~cfc/Chabris2008b.pdf>

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## Is Time Money?

- Yes!
- We love to blame IT for delaying business improvement plans, but...
  - Traditional pricing analyses are very data hungry
  - We seek sufficient data volumes to be 'confident' in a decision
- Pricing models: allow 3-6 months development of incurred claims
- Conversion models: allow 15-30 days quote run-off
- AB testing of operational processes: when do we conclude that B is best?
  - If your goal is to get 10,000 responses, how quickly can you get them?

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## Fictional Example (1)

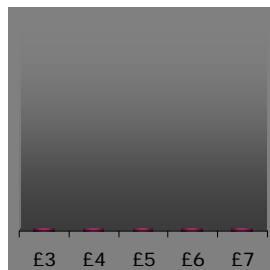
- I am setting up a sandwich shop in Cobham, Surrey
  - How many staff should I recruit?
  - Do I need the same number every day of the week?
- Two Options:
  - Gather data on lunch time spending habits for, say, 1 month
  - Ask some local experts?

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## Fictional Example (1): Ask the Audience

# Q

- What will be the average spend per customer?

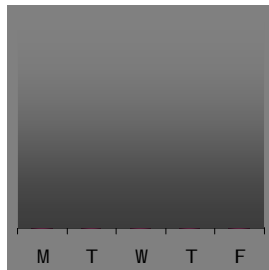


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### Fictional Example (1): Ask the Audience

Q

- Which day of the week will be the busiest?



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### Fictional Example (1): Gather Data



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## Fictional Example (1): Gather Data

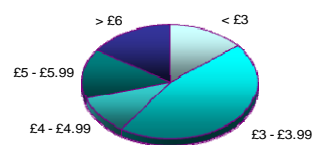
Q

- What will be the average spend per customer?

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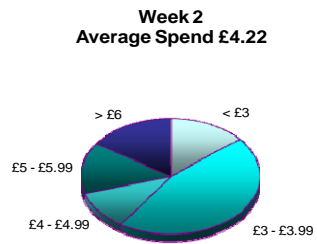
## Fictional Example (1): Gather Data

Week 1  
Average Spend £4.25



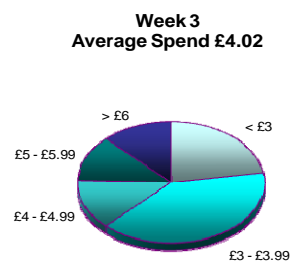
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## Fictional Example (1): Gather Data



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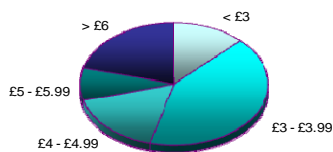
## Fictional Example (1): Gather Data



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## Fictional Example (1): Gather Data

**Week 4**  
Average Spend £4.33



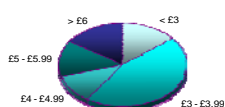
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## Fictional Example (1): Gather Data

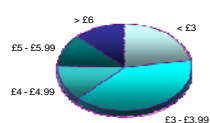
**Week 1**  
Average Spend £4.25



**Week 2**  
Average Spend £4.22



**Week 3**  
Average Spend £4.02



**Week 4**  
Average Spend £4.33



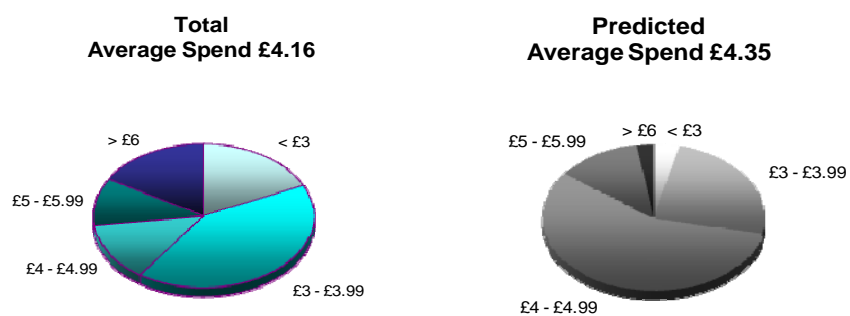
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## Fictional Example (1): Gather Data



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## Fictional Example (1): Gather Data

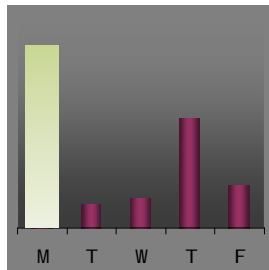


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## Fictional Example (1): Gather Data

Q

**Our survey says**



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## Fictional Example (1): Conclusions so far

- Our 'local experts' were pretty good at predicting the average value of the items surveyed
  - If distribution is important, the data may win out
- Employ an extra member of staff on a Monday based on expert knowledge
  - Gather data before designing 'last week before pay day' special offers

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## Fictional Example (1): Conclusions so far

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- Our 'local experts' were pretty good at predicting the average value of the items surveyed
  - If distribution is important, the data may win out
- A Third Option?
  - Gather data on lunch time spending habits for, say, 1 month
  - Ask some local experts?
  - Buy some external data?

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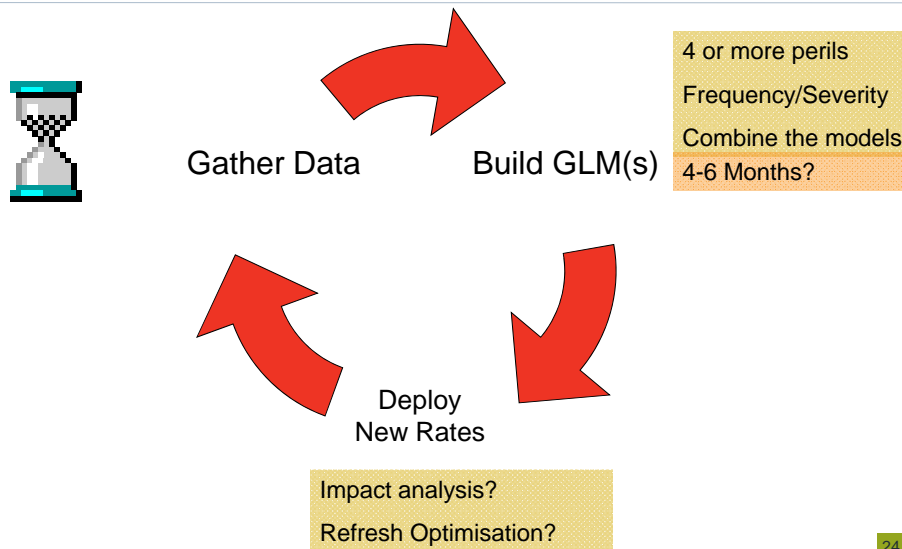
## (Highly) Fictional Example (2): A Motor Portfolio

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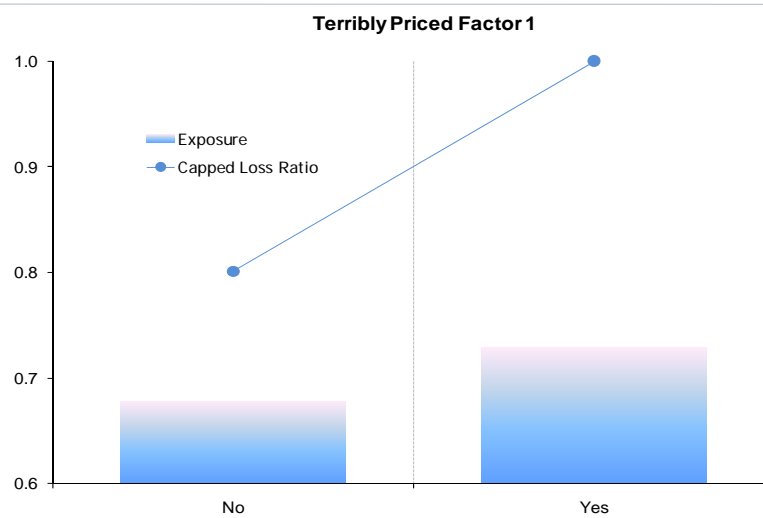
- You're asked to care-take a portfolio of 500,000 Motor policies
  - Any profit you make in 2012 is yours to keep
- There's just you and your actuarial assistant
  - How do you invest YOUR capital?

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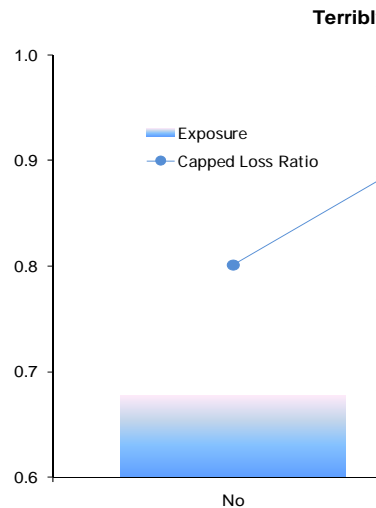
## A Traditional Approach to Pricing



## (Less) Fictional Example (2): Existing Rating Factor



## (Less) Fictional Example (2): Existing Rating Factor



- You spot this in a one-way loss ratio report on a Friday afternoon
- You have a chance to change your rates on Monday or in four weeks time
- This factor will be included in the GLM your analyst is building
- Do you take action now or wait?

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## (Less) Fictional Example (2): Existing Rating Factor

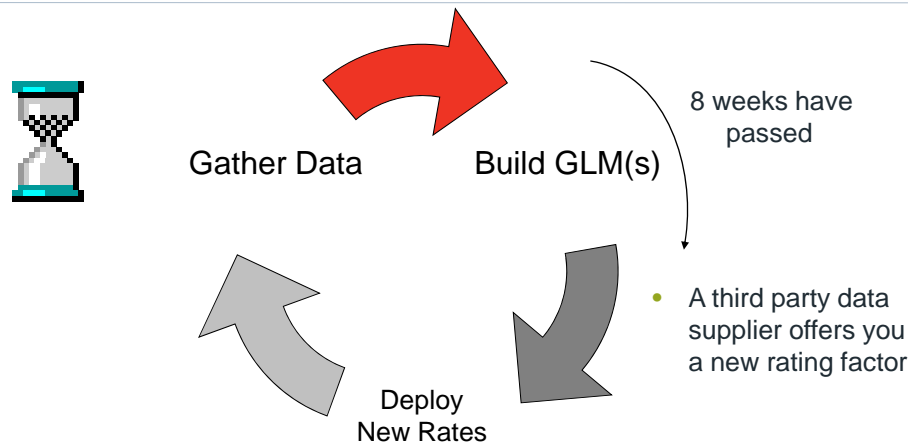
	Exposure	GEP	Average Premium	Loss Ratio
No	150	60,000	400	70%
Yes	350	143,500	410	88%
Total	500	203,500	407	82%

- With an 18% expense ratio, each 'Yes' policy written is costing you £23
- We're writing about 1400 policies a day
  - 1000 of which are 'Yes'
- So we're losing £23k a day on these policies
  - Over £600k in the next 4 weeks

- You spot this in a one-way loss ratio report on a Friday afternoon (large claims capped and spread)
- You have a chance to change your rates on Monday or in four weeks time
- This factor will be included in the GLM your analyst is building
- Do you take action now or wait?
  - If you use the next 4 weeks to work on your response, will it compensate for the short-term losses?

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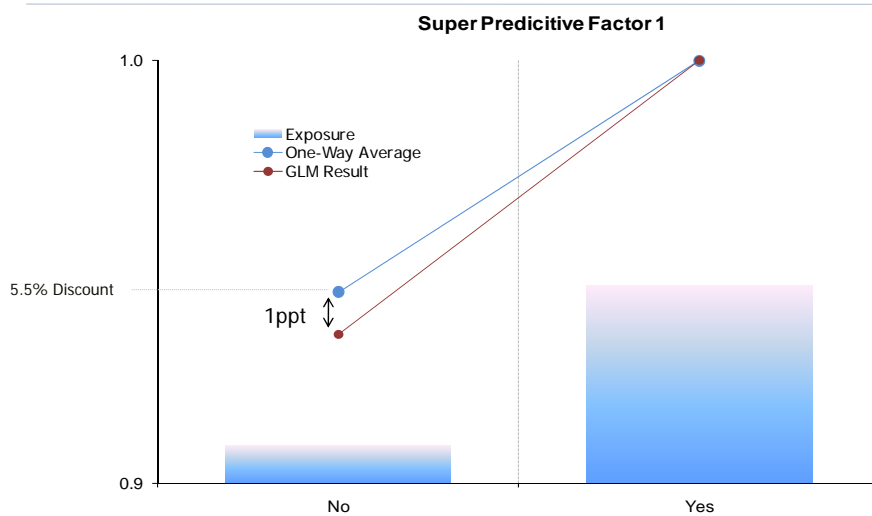
## (Less) Fictional Example (2): New Rating Factor



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## (Less) Fictional Example (2): New Rating Factor

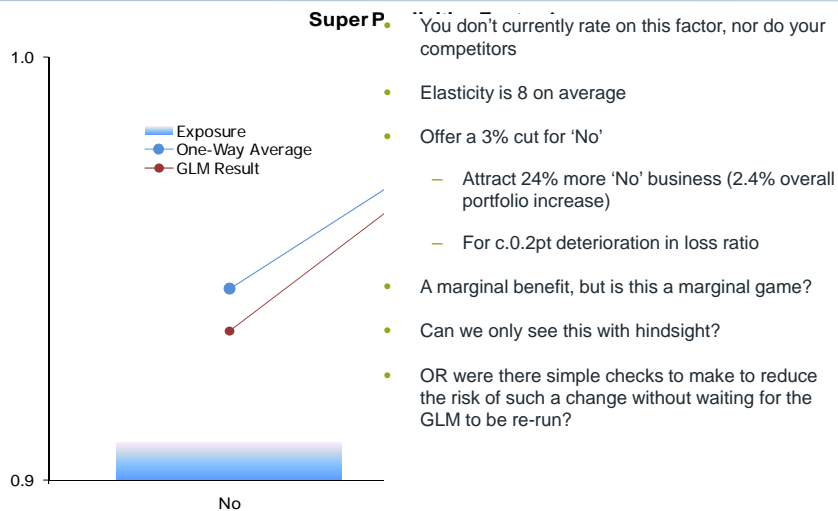
(with the benefit of hindsight)



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## (Less) Fictional Example (2): New Rating Factor

(with the benefit of hindsight)



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## One Month Later: Another test of your resolve

### ■ Rated Area:

- A certain region of the UK is converting at three times your average conversion rate. You only have 10,000 vehicle years experience in those areas but the loss ratio is 50% higher than average. Do you:
  - Expand the remit of your GLM project to include a postcode review: compare the results to your current rates then implement any changes as recommended by the model, or
  - Assume the market knows something you don't. Introduce rate increases of 20% immediately and monitor conversion. Look into the poor performance in more detail.

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## One Month Later: Another test of your resolve

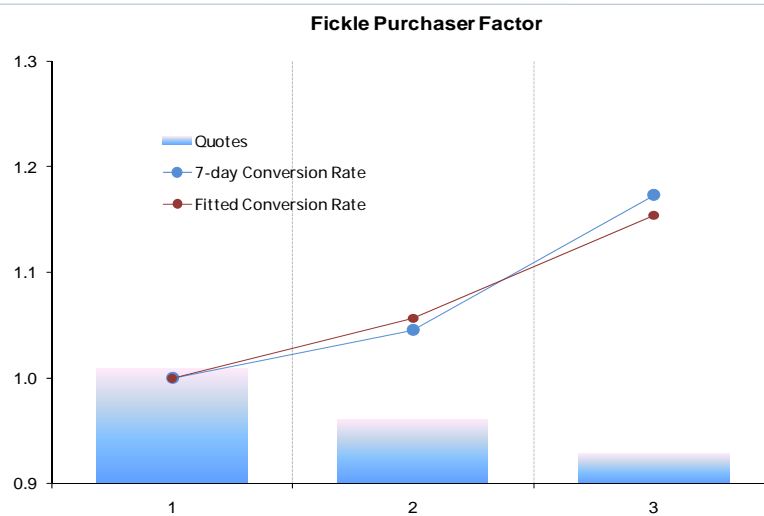
### ■ Rated Area:

- A certain region of the UK is converting at three times your average conversion rate. You only have 10,000 vehicle years experience in those areas but the loss ratio is 50% higher than average.

	Exposure	GEP	Average Premium	Loss Ratio	Loss Per Policy	Loss Per Day
Dodgy	10	4,500	450	122%	£178	£4,888
Leafy	490	199,920	408	81%	-£4	-£4,930
Total	500	204,420	409	82%	£0	-£41

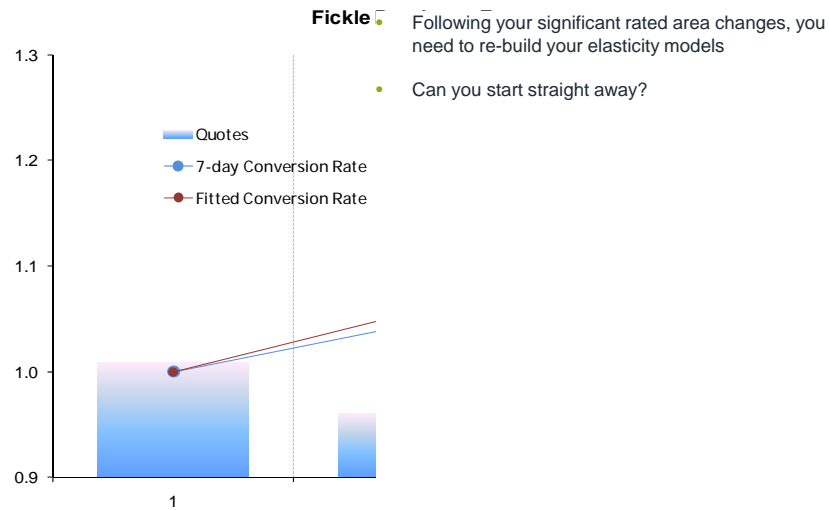
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## (Less) Fictional Example (2): Conversion



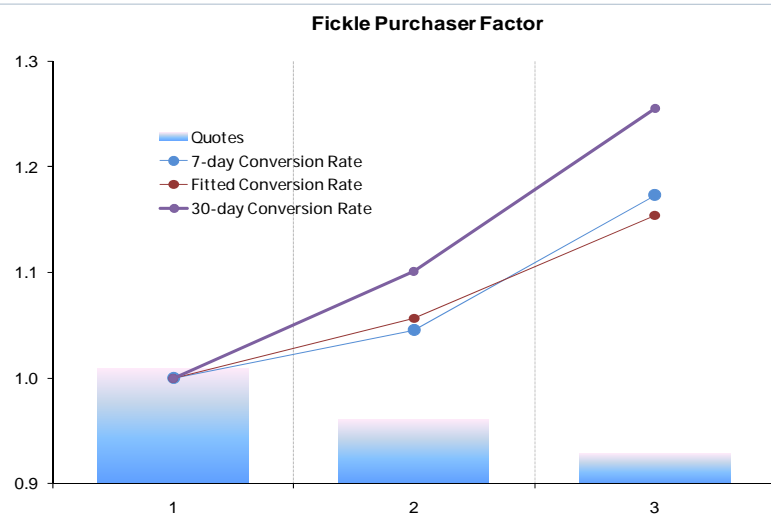
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## (Less) Fictional Example (2): Conversion



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## (Less) Fictional Example (2): Conversion



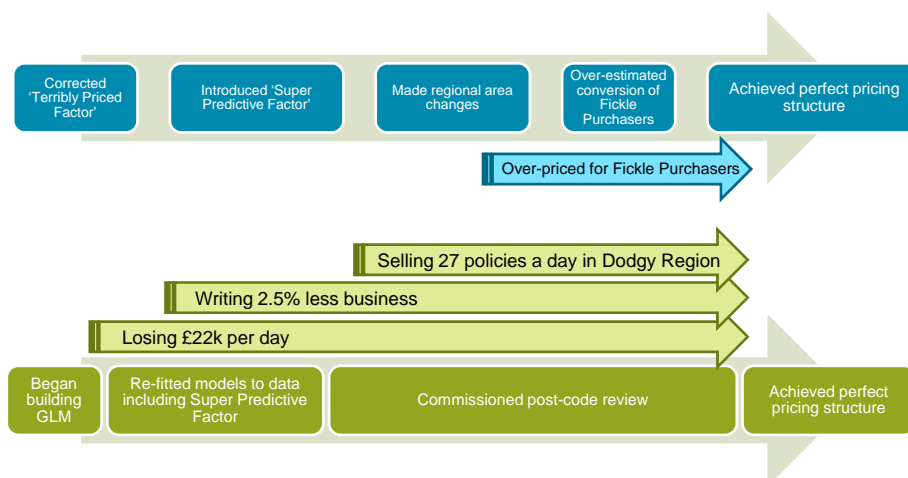
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## (Highly) Fictional Example (2): A Motor Portfolio How did you do?

- You're asked to care-take a portfolio of 500,000 Motor policies
  - Any profit you make in 2012 is yours to keep
- There's just you and your actuarial assistant
  - How do you invest YOUR capital?

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## (Highly) Fictional Example (2): A Motor Portfolio How did you do?



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## (Highly) Fictional Example (2): A Motor Portfolio

### How did you do?



- We end with the same rates
- But can we start reaping the benefits more quickly?



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## Any learnings from the Sandwich example?

- We're unlikely to have data (readily) available to support all significant business decisions
- Numerical analysis can undoubtedly enhance the majority of business decisions but what is the cost of the additional time taken to gain additional accuracy?
- Is the role of the actuary always to analyse data and establish the most accurate answer?



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## Why all this matters

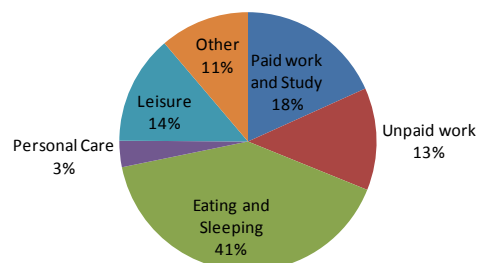
- If decisions are all data driven, can these ultimately all be automated?
  - Do even the most complex airplanes have an auto-pilot?



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## Why all this matters

- Your time (& brain power) are your capital to invest:
  - How will you get the greatest return possible?
  - What can you do to forecast the return to help you allocate time effectively?



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## Is Time Money?

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- Yes!



- Get your analytical house in order before blaming IT...