

# **Speed Reading: Portfolio Tracking in a Recession**

**Conference paper**

**30 June 2009**

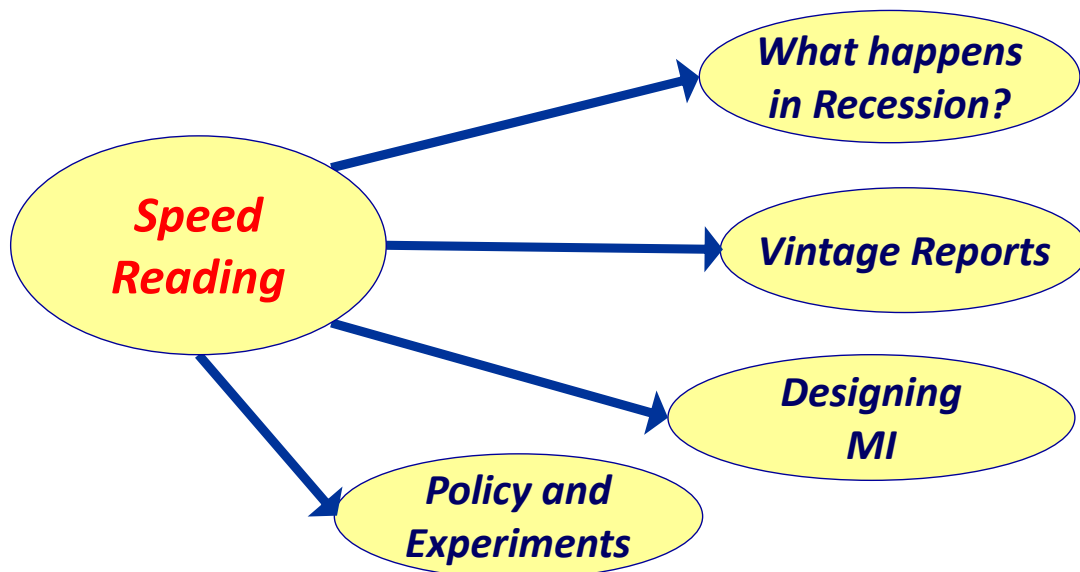
**Gerard Scallan - Scoreplus**  
**gerard.scallan@scoreplus.com**



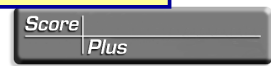
→ data → information → profit

Conference paper: Speed Reading © Scoreplus SARL 2009

## **Speed Reading: Structure of Presentation**



**Using portfolio tracking in a recession**



# What happens in a recession?

**New business**

- Volume declines
- Reduction in demand
- Score profile improves

**Account management**

- Increased balances – bad risks
- De-leveraging – especially good risks
- Reduced appetite for credit
- Average Balances go down

**Pre-delinquency**





- Deterioration in cure rates
- More entries to collections
  - Drivers: unemployment
    - ... and underemployment
- Interest rates remain low
  - different from previous recessions
- Certain parts of population unaffected
  - e.g. public sector

**Collections**

**Recoveries**

- Payments slow down
- Slowest to come out

# Portfolio mix in recession

- Earliest effect on unsecured loans 
- Poor performance of consolidation loans
  - and re-financing 
- Most serious on mortgages
  - but hits later in time 
- Credit cards less affected
  - balances grow on bads 

**Position for resilience**

# Management Actions

## Mitigate risks

**New business**

- Price changes
- Reduce marketing spend
- Cut-offs
- Sustainability of income
- Change scorecards?

**Account management**

- More selective limit increases
- Improve margins - selectively

**Pre-delinquency**

- Create priority relationships
- Reduce limits on high risks
- Assess longer-term prospects
- Update LTV estimates

**Collections**

- Intensify early collections
- Use payment plans
- Consolidate onto mortgage

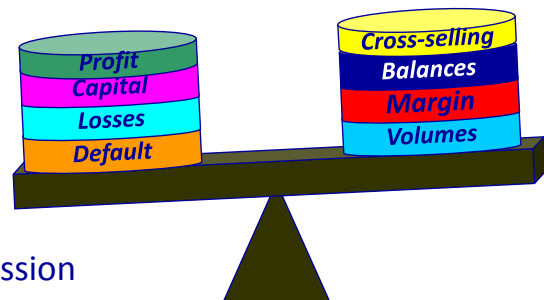
**Recoveries**

- Partial settlements
- Bear the pain

# Management Balance

## Limit losses <-> Preserve potential

- Portfolio Mix
  - Grow margins to cover losses
  - Build customer loyalty
  - Position for recovery
  - Cheap to buy market share in recession
- Design products to reduce volatility
  - Fixed/variable rates
  - Link savings to future borrowing rights
  - Next challenge: inflation



**Key Competitive Factor: Speed of Corporate Response**

# Scoring and Competition

## ... speed of response

C  
O  
M  
P  
E  
T  
I  
T  
I  
V  
E

### INNOVATIVE

- new products
- delivery channels

### INDIVIDUAL

- adapt to niches
- automated

### INFORMATION

- analytic
- complete

### CONTROL

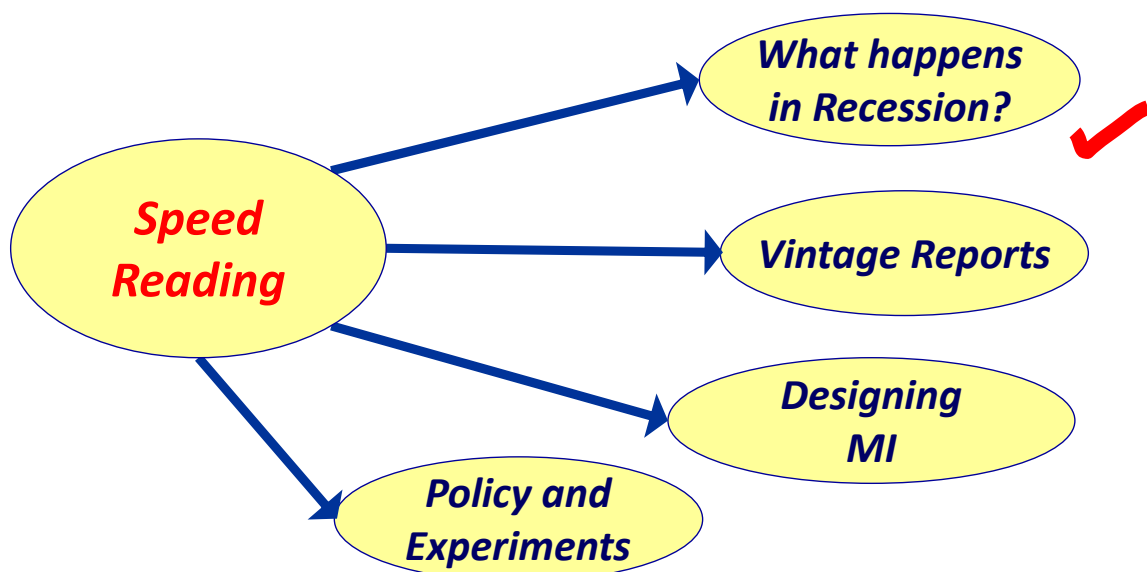
- centralised
- communication

### EFFICIENT

- low cost delivery
- open to change

R  
E  
S  
P  
O  
N  
S  
I  
V  
E

## Speed Reading: Structure of Presentation



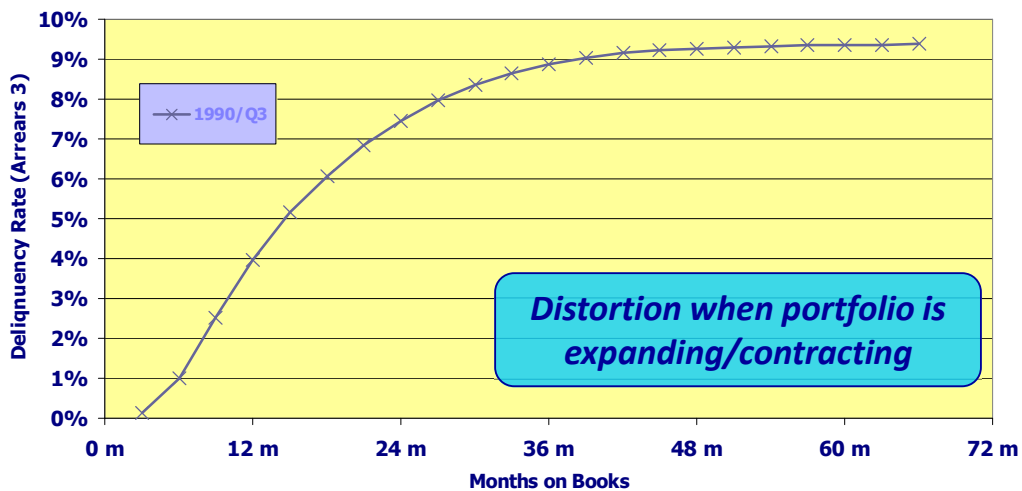
**Using portfolio tracking in a recession**

# Actual Vintage Matrix: UK Recession 1990

Opening Quarter	A/C open	From to	0 m - 3 m	3 m - 6 m	6 m - 9 m	9 m - 12 m	12 m - 15 m	15 m - 18 m	18 m - 21 m	21 m - 24 m	24 m - 27 m	27 m - 30 m	30 m - 33 m	33 m - 36 m	36 m - 39 m	39 m - 42 m	42 m - 45 m	45 m - 48 m
1989/Q4	34841		0.1%	0.1%	1.6%	2.7%	3.6%	4.2%	4.5%	5.6%	6.1%	6.9%	7.2%	7.4%	7.6%	7.8%	7.9%	7.9%
1990/Q1	35677		0.0%	0.7%	1.8%	3.1%	4.3%	5.3%	6.1%	6.7%	7.4%	7.8%	8.1%	8.4%	8.6%	8.7%	8.8%	8.9%
1990/Q2	36614		0.1%	0.9%	2.2%	3.7%	4.9%	6.0%	6.8%	7.5%	8.0%	8.5%	8.8%	9.0%	9.2%	9.4%	9.4%	9.5%
1990/Q3	36436		0.1%	1.0%	2.5%	4.0%	5.2%	6.1%	6.8%	7.5%	8.0%	8.4%	8.7%	8.9%	9.0%	9.2%	9.2%	9.3%
1990/Q4	38157		0.1%	1.2%	2.6%	4.1%	5.3%	6.4%	7.1%	7.8%	8.3%	8.7%	9.0%	9.2%	9.4%	9.5%	9.5%	9.6%
1991/Q1	38661		0.1%	1.0%	2.4%	3.8%	5.0%	5.9%	6.7%	7.3%	7.8%	8.2%	8.5%	8.7%	8.8%	8.9%	8.9%	9.0%
1991/Q2	40624		0.1%	0.9%	2.2%	3.5%	4.5%	5.3%	6.0%	6.7%	7.1%	7.4%	7.7%	7.8%	7.9%	8.0%	8.1%	8.1%
1991/Q3	42872		0.1%	0.9%	2.1%	3.2%	4.2%	5.0%	5.7%	6.2%	6.6%	6.9%	7.1%	7.2%	7.3%	7.4%	7.5%	7.5%
1991/Q4	44150		0.1%	0.8%	1.9%	2.9%	3.9%	4.7%	5.3%	5.7%	6.1%	6.3%	6.4%	6.6%	6.7%	6.7%	6.8%	6.9%
1992/Q1	45330		0.1%	0.8%	1.7%	2.8%	3.8%	4.4%	5.0%	5.5%	5.8%	6.0%	6.1%	6.3%	6.4%	6.5%	6.5%	6.6%
1992/Q2	47769		0.1%	0.8%	1.8%	2.9%	3.7%	4.3%	4.8%	5.2%	5.4%	5.6%	5.8%	5.9%	6.0%	6.1%	6.1%	
1992/Q3	48587		0.1%	0.8%	1.8%	2.6%	3.4%	4.0%	4.4%	4.7%	5.0%	5.2%	5.3%	5.4%	5.5%	5.6%		
1992/Q4	49334		0.1%	0.8%	1.7%	2.6%	3.3%	3.9%	4.1%	4.6%	4.8%	5.0%	5.2%	5.3%	5.4%			
1993/Q1	51777		0.1%	0.7%	1.6%	2.4%	3.0%	3.6%	3.9%	4.2%	4.4%	4.6%	4.8%	4.9%				
1993/Q2	53932		0.1%	0.7%	1.5%	2.2%	2.7%	3.2%	3.6%	3.9%	4.1%	4.3%	4.5%					
1993/Q3	55600		0.1%	0.7%	1.5%	2.1%	2.6%	3.0%	3.4%	3.7%	3.9%	4.2%						
1993/Q4	56840		0.1%	0.7%	1.4%	2.2%	2.7%	3.2%	3.5%	3.9%	4.2%							
1994/Q1	58353		0.1%	0.6%	1.4%	2.2%	2.8%	3.3%	3.8%	4.2%								
1994/Q2	61242		0.1%	0.7%	1.5%	2.2%	3.0%	3.6%	4.0%									
1994/Q3	62591		0.1%	0.7%	1.6%	2.4%	3.1%	3.6%										
1994/Q4	64363		0.1%	0.8%	1.7%	2.7%	3.5%											
1995/Q1	66421		0.1%	0.8%	1.8%	2.8%												
1995/Q2	71447		0.1%	0.7%	1.7%													
1995/Q3	74309		0.1%	0.9%														
1995/Q4	76460		0.1%															

## Overview of portfolio development

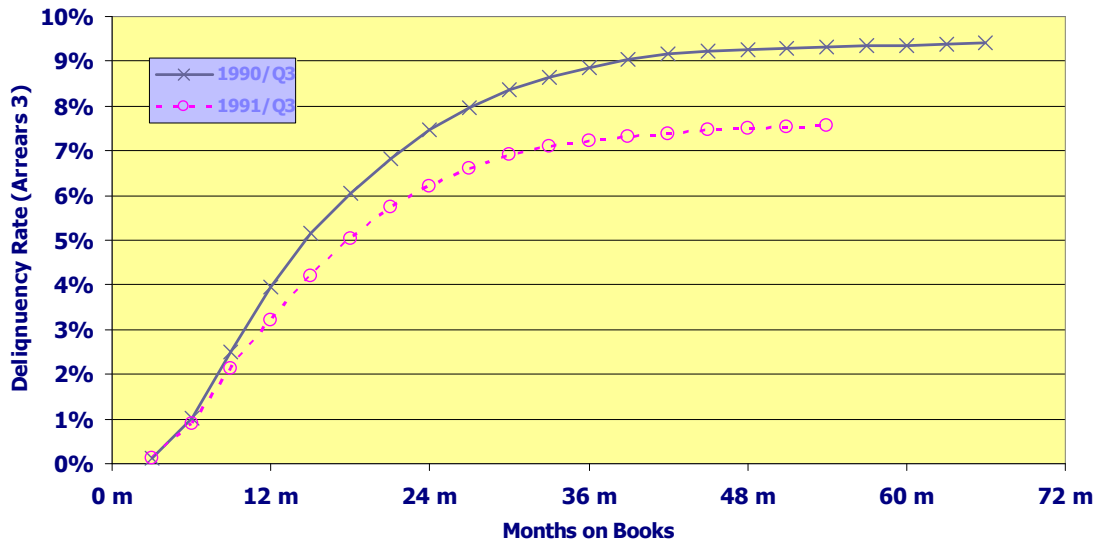
## Lifecycle Effect



## Dominant effect in delinquency

# New Account Effect

## Graphical representation



**How soon can you spot the difference?**



# New Account Effect:

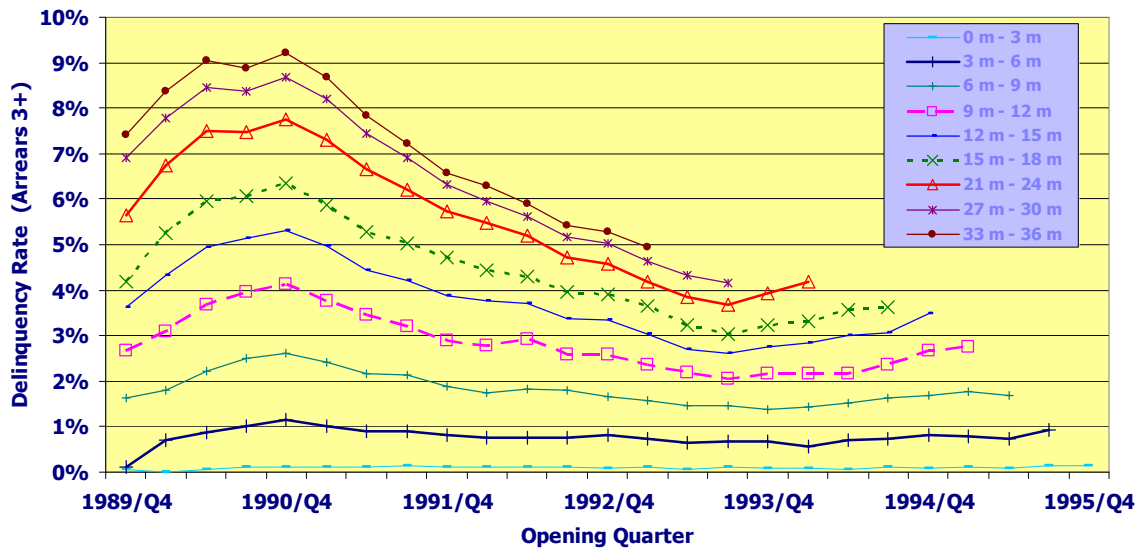
## Row comparison

Opening Quarter	A/C open	From to	0 m - 3 m	3 m - 6 m	6 m - 9 m	9 m - 12 m	12 m - 15 m	15 m - 18 m	18 m - 21 m	21 m - 24 m	24 m - 27 m	27 m - 30 m	30 m - 33 m	33 m - 36 m	36 m - 39 m	39 m - 42 m	42 m - 45 m
1989/Q4	34841		0.07%	0.11%	1.6%	2.7%	3.6%	4.2%	4.5%	5.6%	6.1%	6.9%	7.2%	7.4%	7.6%	7.8%	7.9%
1990/Q1	35677		0.00%	0.70%	1.8%	3.1%	4.3%	5.3%	6.1%	6.7%	7.4%	7.8%	8.1%	8.4%	8.6%	8.7%	8.8%
1990/Q2	36614		0.07%	0.88%	2.2%	3.7%	4.9%	6.0%	6.8%	7.5%	8.0%	8.5%	8.8%	9.0%	9.2%	9.4%	9.4%
1990/Q3	36436		0.12%	1.01%	2.5%	4.0%	5.2%	6.1%	6.8%	7.5%	8.0%	8.4%	8.7%	8.9%	9.0%	9.2%	9.2%
1990/Q4	38157		0.11%	1.15%	2.6%	4.1%	5.3%	6.4%	7.1%	7.8%	8.3%	8.7%	9.0%	9.2%	9.4%	9.5%	9.5%
1991/Q1	38661		0.12%	1.00%	2.4%	3.8%	5.0%	5.9%	6.7%	7.3%	7.8%	8.2%	8.5%	8.7%	8.8%	8.9%	8.9%
1991/Q2	40624		0.12%	0.89%	2.2%	3.5%	4.5%	5.3%	6.0%	6.7%	7.1%	7.4%	7.7%	7.8%	7.9%	8.0%	8.1%
1991/Q3	42872		0.13%	0.89%	2.1%	3.2%	4.2%	5.0%	5.7%	6.2%	6.6%	6.9%	7.1%	7.2%	7.3%	7.4%	7.5%
1991/Q4	44150		0.10%	0.82%	1.9%	2.9%	3.9%	4.7%	5.3%	5.7%	6.1%	6.3%	6.4%	6.6%	6.7%	6.7%	6.8%
1992/Q1	45330		0.11%	0.77%	1.7%	2.8%	3.8%	4.4%	5.0%	5.5%	5.8%	6.0%	6.1%	6.3%	6.4%	6.5%	6.5%
1992/Q2	47769		0.10%	0.75%	1.8%	2.9%	3.7%	4.3%	4.8%	5.2%	5.4%	5.6%	5.8%	5.9%	6.0%	6.1%	6.1%
1992/Q3	48587		0.10%	0.75%	1.8%	2.6%	3.4%	4.0%	4.4%	4.7%	5.0%	5.2%	5.3%	5.4%	5.5%	5.6%	
1992/Q4	49334		0.09%	0.81%	1.7%	2.6%	3.3%	3.9%	4.1%	4.6%	4.8%	5.0%	5.2%	5.3%	5.4%		
1993/Q1	51777		0.10%	0.72%	1.6%	2.4%	3.0%	3.6%	3.9%	4.2%	4.4%	4.6%	4.8%	4.9%			
1993/Q2	53932		0.07%	0.65%	1.5%	2.2%	2.7%	3.2%	3.6%	3.9%	4.1%	4.3%	4.5%				
1993/Q3	55600		0.10%	0.67%	1.5%	2.1%	2.6%	3.0%	3.4%	3.7%	3.9%	4.2%					
1993/Q4	56840		0.08%	0.67%	1.4%	2.2%	2.7%	3.2%	3.5%	3.9%	4.2%						
1994/Q1	58353		0.08%	0.57%	1.4%	2.2%	2.8%	3.3%	3.8%	4.2%							
1994/Q2	61242		0.07%	0.70%	1.5%	2.2%	3.0%	3.6%	4.0%								
1994/Q3	62591		0.11%	0.73%	1.6%	2.4%	3.1%	3.6%									
1994/Q4	64363		0.09%	0.81%	1.7%	2.7%	3.5%										
1995/Q1	66421		0.12%	0.78%	1.8%	2.8%											
1995/Q2	71447		0.09%	0.74%	1.7%												
1995/Q3	74309		0.13%	0.93%													
1995/Q4	76460		0.13%														

**Change in recruitment: product, marketing, underwriting**



# Vintage Graph: Cohort representation



**Hides lifecycle effect – highlights new account effects**

## Vintage Matrix Specifications

- Frequency: Monthly
  - Establish more detailed patterns than quarterly
- Bad Definition: Currently Arrears 2+
  - not “maximum delinquency” or Basel definitions
  - see improving trends faster
- Denominator: Accounts opened
  - Same across row – avoid distortions with closed accounts
- Rows: Open month x product type
  - E.g. Loan Purpose: Debt Consolidation, New Lending

**Design to get fastest, clearest feedback  
KEY FOR MANAGEMENT DIRECTION**

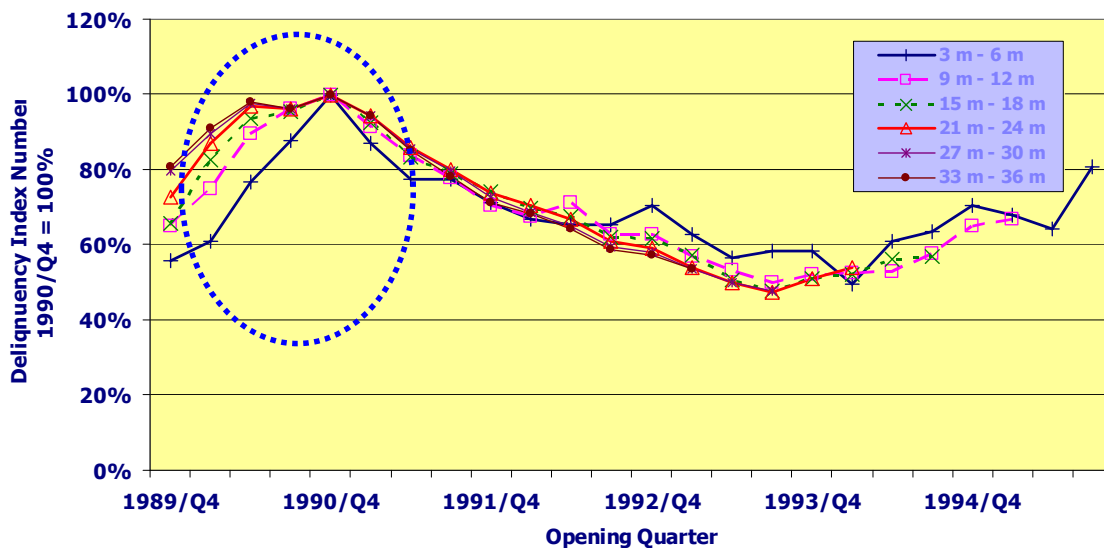
# Vintage Index Matrix: Allows early comparisons

Opening Quarter	A/C open	From to	0 m - 3 m	3 m - 6 m	6 m - 9 m	9 m - 12 m	12 m - 15 m	15 m - 18 m	18 m - 21 m	21 m - 24 m	24 m - 27 m	27 m - 30 m	30 m - 33 m	33 m - 36 m	36 m - 39 m	39 m - 42 m	42 m - 45 m
Standard	1990/Q4		0.1%	1.2%	2.6%	4.1%	5.3%	6.4%	7.1%	7.8%	8.3%	8.7%	9.0%	9.2%	9.4%	9.5%	9.5%
1989/Q4	34841		64%	56%	63%	65%	68%	66%	63%	73%	73%	79%	80%	81%	81%	82%	83%
1990/Q1	35677		64%	61%	69%	75%	81%	83%	86%	87%	89%	90%	90%	91%	91%	92%	93%
1990/Q2	36614		64%	77%	85%	90%	93%	94%	95%	97%	97%	97%	98%	98%	98%	99%	99%
1990/Q3	36436		109%	88%	96%	96%	97%	95%	96%	96%	96%	96%	96%	96%	96%	97%	97%
1990/Q4	38157		100%	100%	100%	100%	100%	100%	100%	100%	100%	100%	100%	100%	100%	100%	100%
1991/Q1	38661		109%	87%	93%	91%	94%	92%	94%	94%	94%	94%	94%	94%	94%	93%	94%
1991/Q2	40624		109%	77%	83%	84%	84%	83%	85%	86%	85%	86%	85%	85%	85%	85%	85%
1991/Q3	42872		118%	77%	82%	78%	79%	79%	80%	80%	79%	79%	79%	78%	78%	78%	79%
1991/Q4	44150		91%	71%	72%	70%	73%	74%	74%	74%	73%	73%	72%	71%	71%	71%	72%
1992/Q1	45330		100%	67%	67%	67%	71%	70%	70%	71%	70%	69%	68%	68%	68%	68%	69%
1992/Q2	47769		91%	65%	70%	71%	70%	68%	67%	67%	65%	65%	64%	64%	64%	64%	65%
1992/Q3	48587		91%	65%	69%	63%	63%	62%	62%	61%	60%	59%	59%	59%	59%	59%	59%
1992/Q4	49334		82%	70%	64%	63%	63%	61%	57%	59%	58%	58%	58%	57%	58%		
1993/Q1	51777		91%	63%	60%	57%	57%	57%	54%	54%	53%	53%	54%	54%			
1993/Q2	53932		64%	57%	56%	53%	51%	51%	50%	50%	49%	50%	50%				
1993/Q3	55600		91%	58%	56%	50%	49%	48%	48%	47%	47%	48%					
1993/Q4	56840		73%	58%	53%	52%	52%	51%	49%	51%	51%						
1994/Q1	58353		73%	50%	54%	52%	53%	52%	53%	54%							
1994/Q2	61242		64%	61%	58%	53%	56%	56%	57%								
1994/Q3	62591		100%	63%	62%	58%	58%	57%									
1994/Q4	64363		82%	70%	65%	65%	66%										
1995/Q1	66421		109%	68%	67%	67%											
1995/Q2	71447		82%	64%	65%												
1995/Q3	74309		118%	81%													
1995/Q4	76460		118%														

**Index number:**  $\frac{\text{delinquency rate in cell}}{\text{rate in reference period (with same exposure)}}$   
 e.g. 1990/Q3, 10 - 12 m exposure:  $4.0\%/4.1\% = .96$



# Vintage Index Graph: Shows portfolio effects



**Portfolio effect: convergence/divergence of indices**





# Portfolio Effect – onset of recession

## Diagonal term

Opening Quarter Standard	A/C open	From to	0 m - 3 m	3 m - 6 m	6 m - 9 m	9 m - 12 m	12 m - 15 m	15 m - 18 m	18 m - 21 m	21 m - 24 m	24 m - 27 m
			0.1%	1.2%	2.6%	4.1%	5.3%	6.4%	7.1%	7.8%	8.3%
1989/Q4	34841		64%	56%	63%	65%	68%	66%	63%	73%	73%
1990/Q1	35677		64%	61%	69%	75%	81%	83%	86%	87%	89%
1990/Q2	36614		64%	77%	85%	90%	93%	94%	95%	97%	97%
1990/Q3	36436		109%	88%	96%	96%	97%	95%	96%	96%	96%
1990/Q4	38157		100%	100%	100%	100%	100%	100%	100%	100%	100%
1991/Q1	38661		109%	87%	93%	91%	94%	92%	94%	94%	94%
1991/Q2	40624		109%	77%	83%	84%	84%	83%	85%	86%	85%
1991/Q3	42872		118%	77%	82%	78%	79%	79%	80%	80%	79%
1991/Q4	44150		91%	71%	72%	70%	73%	74%	74%	74%	73%

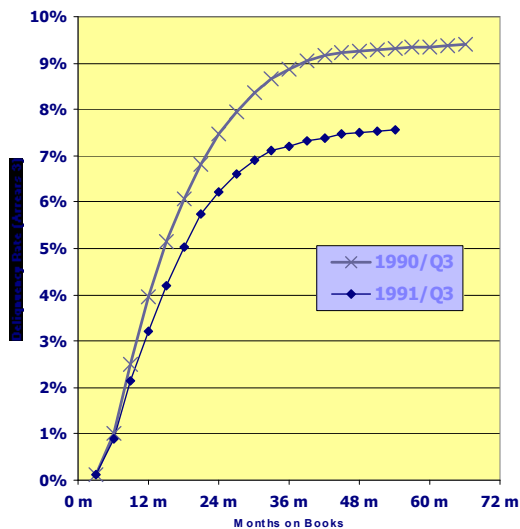
- Change in shape of lifecycle curve
- Vintage starts on one trajectory, moves to another
- Corresponds to change on observation date (diagonal)
- Due to economy, collections system, ....

**Most difficult to spot – key in recession**

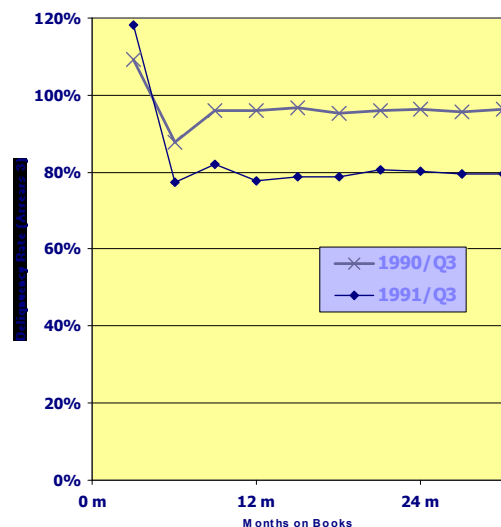
# Timely Policy Modification

## Index numbers give better focus

Lifecycle Curves



Index Numbers

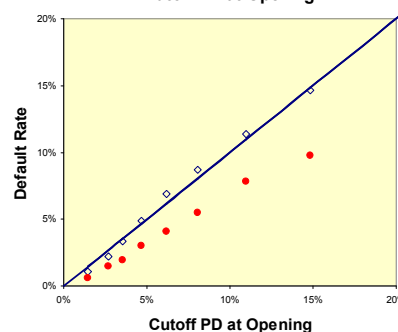
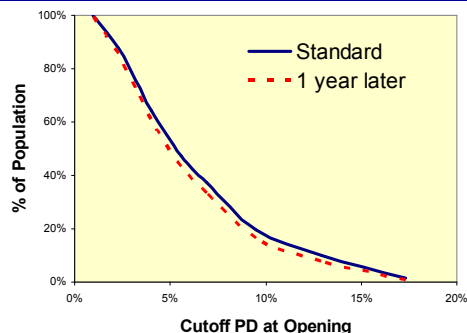


**Faster Response -> Competitive Edge**

# Exit from Recession

## Spot green shoots

- Recession duration
  - Example portfolio: 9 mos
  - 2 years on economic statistics
  - Consumer credit leads economy
- 1<sup>st</sup> sign: improvement in applicant profile
  - K-S = 4%
  - Average PD 6.4% -> 6%
- 2<sup>nd</sup> sign: default rates < PDs
  - Default Rate = 3.8%
- Collections: reacts more slowly
- Recoveries slower still



**Leading Indicator: Population PD**

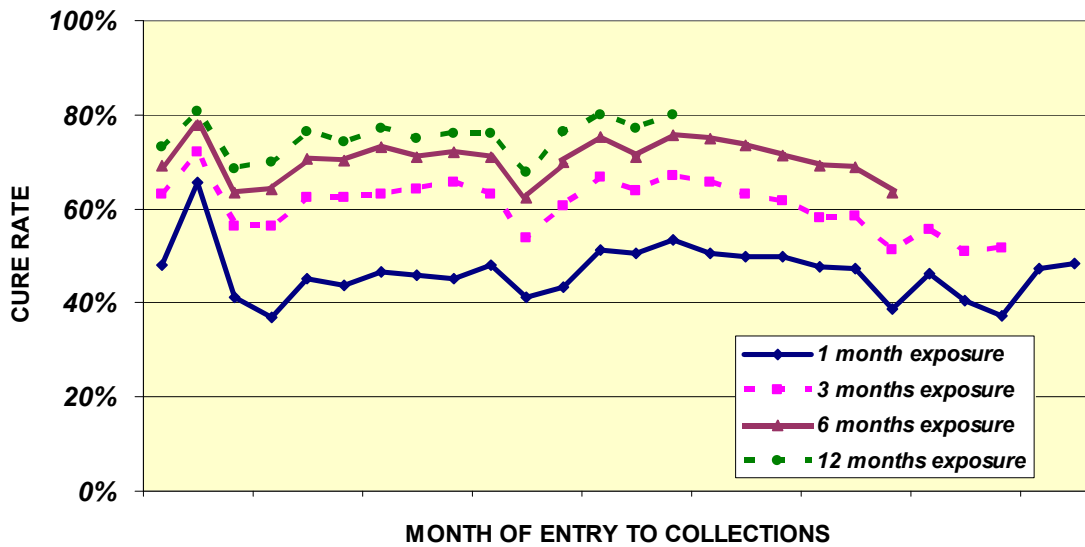
## Vintage matrix applications

- Account openings
  - By open date and time on books:
  - Delinquency
  - Average balance
  - Cross-selling
  - Attrition
- Collections
  - By date entered collections
  - Outcome in weeks
  - Cure rate
  - Balance growth
  - Transfers to recovery
- Recoveries
  - By date entered
  - Cash recovered

**Management must be able to explain fluctuations**  
**Group reporting tool**

# Collections Cure rates

## Key performance indicator



**Differences in performance visible 3-4 weeks after entry**

# Default Rate/Average PD at opening

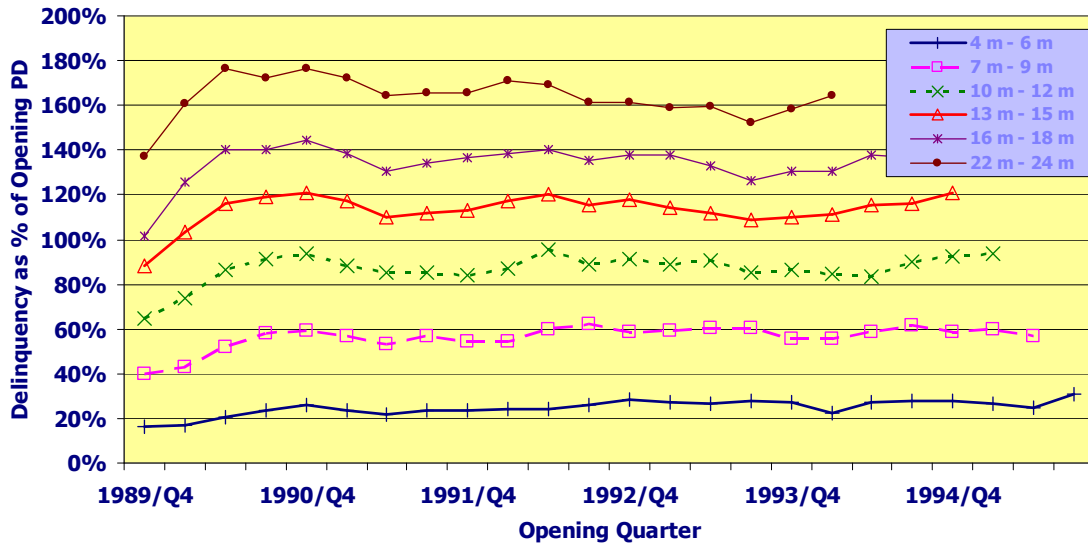
## Understand departures from expectations

Opening Quarter	Avg. PD at opening	From to	0 m - 3 m	3 m - 6 m	6 m - 9 m	9 m - 12 m	12 m - 15 m	15 m - 18 m	18 m - 21 m	21 m - 24 m	24 m - 27 m	27 m - 30 m	30 m - 33 m	33 m - 36 m	36 m - 39 m	39 m - 42 m	42 m - 45 m
1989/Q4	4.1%		2%	17%	40%	65%	88%	101%	109%	137%	148%	167%	174%	180%	184%	189%	191%
1990/Q1	4.2%		2%	17%	43%	74%	103%	126%	146%	161%	177%	186%	193%	200%	204%	208%	210%
1990/Q2	4.3%		2%	21%	52%	87%	116%	140%	159%	176%	188%	199%	207%	212%	216%	220%	222%
1990/Q3	4.3%		3%	23%	58%	91%	119%	140%	158%	172%	184%	193%	200%	205%	209%	212%	213%
1990/Q4	4.4%		3%	26%	59%	94%	121%	145%	162%	176%	189%	197%	204%	209%	213%	215%	216%
1991/Q1	4.3%		3%	24%	57%	88%	117%	138%	157%	172%	184%	193%	199%	204%	207%	208%	209%
1991/Q2	4.1%		3%	22%	53%	85%	110%	131%	149%	164%	175%	183%	189%	194%	196%	198%	199%
1991/Q3	3.8%		3%	24%	57%	85%	112%	134%	153%	166%	176%	184%	189%	192%	195%	197%	199%
1991/Q4	3.5%		3%	24%	54%	84%	113%	137%	153%	166%	176%	183%	187%	190%	193%	195%	198%
1992/Q1	3.2%		3%	24%	54%	87%	118%	138%	157%	171%	182%	186%	192%	196%	199%	202%	203%
1992/Q2	3.1%		3%	24%	60%	95%	121%	140%	156%	169%	177%	183%	189%	193%	196%	198%	200%
1992/Q3	2.9%		3%	26%	62%	89%	115%	135%	152%	161%	170%	177%	182%	186%	190%	193%	
1992/Q4	2.8%		3%	29%	58%	91%	118%	138%	144%	161%	169%	177%	182%	186%	190%		
1993/Q1	2.6%		4%	27%	59%	89%	114%	138%	146%	159%	168%	176%	182%	187%			
1993/Q2	2.4%		3%	27%	60%	90%	112%	133%	147%	160%	169%	179%	186%				
1993/Q3	2.4%		4%	28%	60%	85%	109%	126%	141%	152%	163%	172%					
1993/Q4	2.5%		3%	27%	55%	86%	110%	130%	140%	158%	170%						
1994/Q1	2.5%		3%	22%	56%	85%	111%	130%	148%	164%							
1994/Q2	2.6%		3%	27%	59%	84%	115%	138%	155%								
1994/Q3	2.6%		4%	28%	62%	90%	116%	137%									
1994/Q4	2.9%		3%	28%	59%	92%	121%										
1995/Q1	2.9%		4%	27%	60%	94%											
1995/Q2	3.0%		3%	25%	57%												
1995/Q3	3.0%		4%	31%													
1995/Q4	3.0%		4%														

**Explains most new account effects – e.g. scorecard cut-off**

# Vintage relative to PD

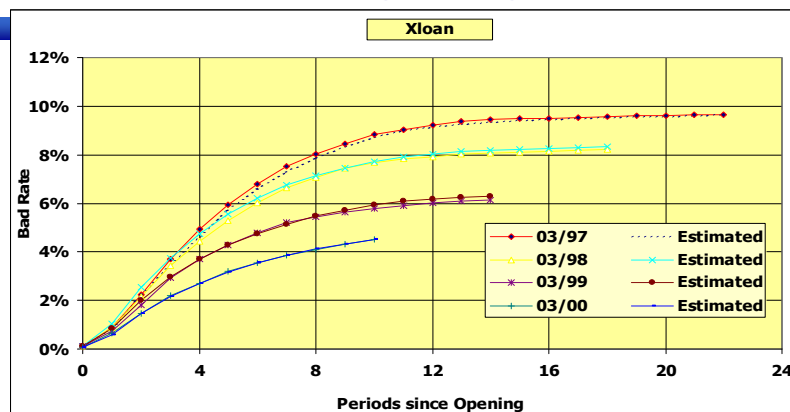
## Actual vs. Expected



**Concentrates on incremental information –  
What is not in the budget?**

# Vintage Matrix Projections

## Key budgeting tool



- “Fill in lower half of vintage matrix”
- Regression time series techniques
  - Scoreplus course “Financial Portfolio Modelling”
- Formalizes the monitoring of the budget
- Facilitates stress test

**Portfolio tracking <-> Portfolio Budget**

# Vintage Matrix Summary

## Design Principles

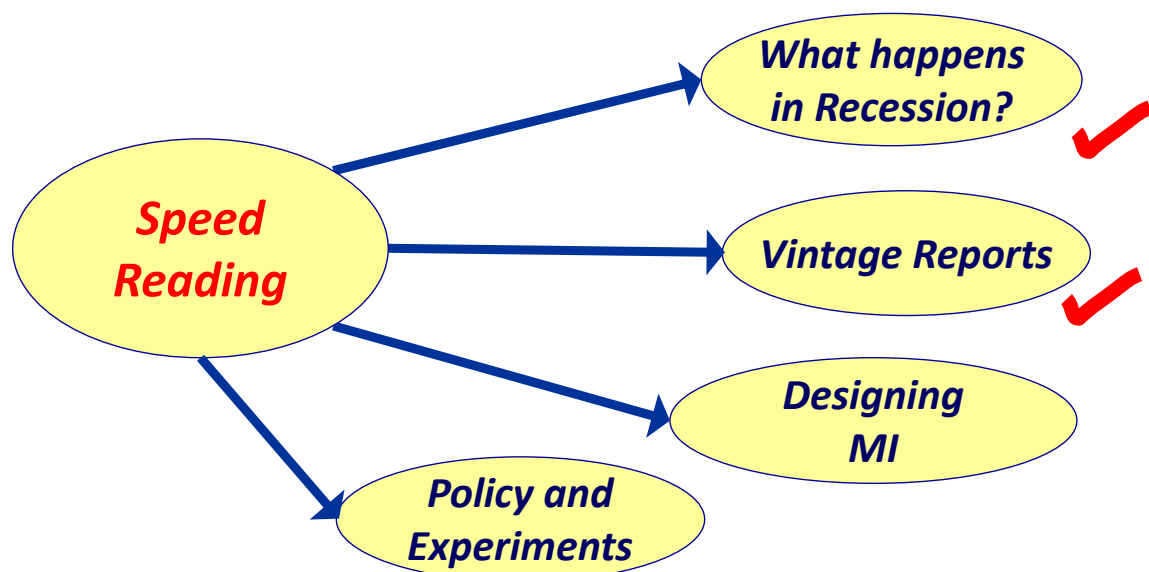
- Key structures
  - Lifecycle Effect
  - New Account Effect
  - Portfolio Effect
- Frequency: monthly
- Express default rate as % of average PD
- Vintage graph to track outcomes
  - Not lifecycle graph

## Best Practice Use

- Discussed at monthly credit committee
- Used for review with Group
- Commentary required on all new account and portfolio effects
- Major changes can be spotted ~4 months after happening
- Leading indicator in recession
  - on entry
  - on exit

**Key report for executive management of portfolios**

# Speed Reading: Structure of Presentation



**Using portfolio tracking in a recession**

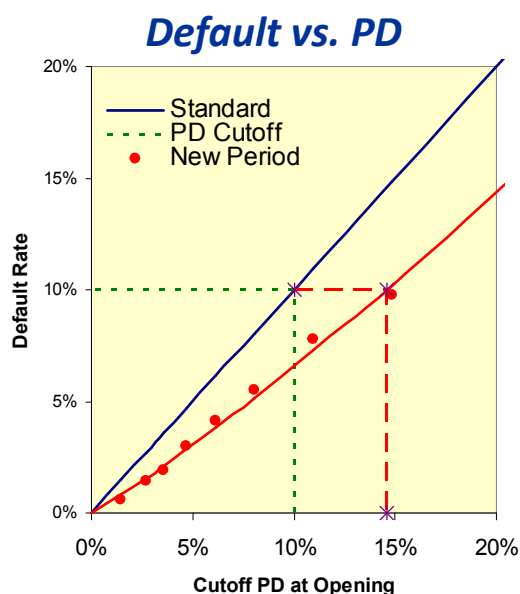
# Tracking Principles

- Actual vs. Expected
  - Match outcome vs. assumptions underlying policy
  - Assumptions correspond to budget
- Report Early (... and Often)
  - Timely policy modification
  - Speed of change is key to competitive positioning
  - Most changes can be identified within 4 months of occurrence
- Understand Portfolio
  - Develop conceptual picture of dynamics of portfolio
- Evaluate policies
  - not just scorecards
- Reliability of Rating Tools
  - Can we believe the numbers?
  - Relevant information missing?
- Regulatory Requirements
  - By-product of good management practice

**Tracking → Learning → Change**

## Actual vs. Expected Principle Fundamental to policy management

- Policy is based on assumptions
- Are assumptions met?
  - Policy Environment
  - Policy Application
  - Subsequent Performance
- Are consequences what we expected?
- Adjust assumptions
  - e.g. PD-Default Rate relationship
- ⇒ Change in policy
  - e.g. Acceptance cut-off
- Set expectations for future



**Tracking must be used to be useful ...**

# Goal: Accelerate Policy Evolution

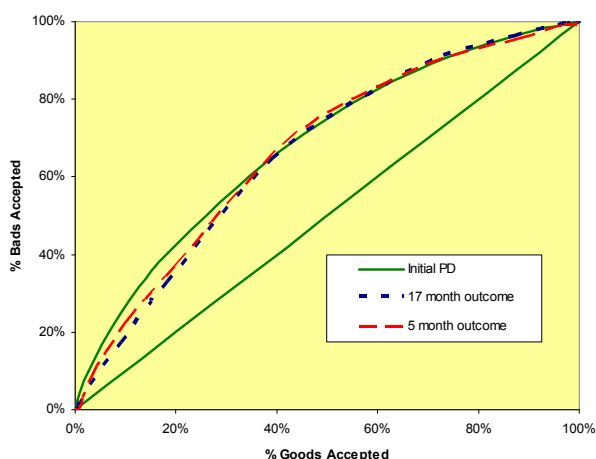
- Example: Timeline from new lending policy
  - Jan 2007 - Loan solicitation policy for credit card holders
  - Mar 2007 - Response rate
  - Mar 2007 - Population profile
  - Jun 2007 - Balance Levels
  - Jun 2007 - Early delinquency
  - Jan 2008 - Revenue
  - Jun 2008 - Full delinquency
  - Dec 2008 - Attrition
  - Dec 2009 - Secured Loan Cross-sell
- 3 year full evaluation
  - But get intermediate feedback

**Can credit risk move as fast as marketing?**

## Early Outcome Measurement Example: Gini Coefficient

- Recession data
  - Accepts only – ignore rejects
- Strategy based on Gini = 36%
- Actual Gini at 17 m. = 32%
  - Based on 827 bads
- Significant deterioration in scorecard
  - Requires change in strategy
- Gini at 5 m. = 33%
  - Based on 136 bads
- Modify limit policy?
- Important features emerge fast

**Gini on Accepts**



**Faster reaction -> More appropriate policies -> More profit**

# Portfolio Risk Overview

## Do strategies meet profit goals?

STRATEGY NODE	BREAKDOWN OF BOOK					RISK ANALYSIS				PROFITABILITY ANALYSIS							
	Cases	% of Book	Total Balances	% of Exposure	Average Balance	Average PD	Expected Loss/ Balance	Expected Loss (€)	Economic Capital/ Balance	Margin/ Account	Fee Income/ Account	Total Revenue/ Account	Profit/ Account	Net Revenue/ EL Ratio	Return on Assets	RAROC	
Strategy Exclusions	Actual	3417	1.64%	€10,992k	1.25%	€3,217.00	16.5%	12.7%	€1,392k	13.2%	8.04%	€ 35.32	€293.92	€ 158.76	61%	-4.93%	-37.32%
	Budget	3200	1.54%	€9,920k	1.10%	€3,100.00	10.7%	6.8%	€675k	9.2%	7.85%	€ 32.49	€275.84	€ 21.53	110%	0.69%	7.55%
	Variance	6.8%	+0.09%	10.8%	+0.16%	3.8%	+5.76%	+5.87%	+106.40%	+4.02%	+0.19%	+8.70%	€ 18.07	€ 180.29		-5.63%	-44.86%
Low Risk, High Usage	Actual	9519	4.56%	€57,885k	6.59%	€6,081.00	3.2%	2.4%	€1,404k	9.1%	7.10%	€ 25.01	€456.54	€ 270.04	283%	4.44%	48.74%
	Budget	10200	4.92%	€66,300k	7.32%	€6,500.00	2.0%	1.3%	€863k	6.9%	7.52%	€ 24.03	€512.85	€ 389.79	561%	6.00%	86.29%
	Variance	-6.7%	-0.36%	-12.7%	-0.73%	-6.4%	+1.10%	+1.12%	+62.62%	+2.16%	-0.42%	+4.08%	€ 56.31	€ 119.75		-1.56%	-37.55%
Low Risk, Medium usage	Actual	23139	11.09%	€97,207k	11.06%	€4,201.00	2.3%	1.8%	€1,729k	8.4%	7.96%	€ 20.43	€354.83	€ 243.84	426%	5.80%	68.98%
	Budget	24600	11.86%	€114,390k	12.63%	€4,650.00	1.5%	1.0%	€1,092k	6.4%	7.90%	€ 19.19	€386.41	€ 306.49	790%	6.59%	103.04%
	Variance	-5.9%	-0.77%	-15.0%	-1.57%	-9.7%	+0.81%	+0.82%	+58.28%	+2.02%	+0.06%	+6.46%	€ 31.58	€ 62.64		-0.79%	-34.06%
Low Risk, Low usage	Actual	26315	12.61%	€36,288k	4.13%	€1,379.00	1.8%	1.3%	€489k	7.7%	8.74%	€ 13.75	€134.34	€ 83.51	549%	6.06%	78.20%
	Budget	25250	12.17%	€41,031k	4.53%	€1,625.00	1.1%	0.7%	€297k	5.5%	8.65%	€ 12.97	€153.54	€ 110.01	1036%	6.77%	123.40%
	Variance	4.2%	+0.44%	-11.6%	-0.40%	-15.1%	+0.61%	+0.62%	+64.73%	+2.26%	+0.09%	+6.01%	€ 19.20	€ 26.50		-0.71%	-45.20%
Medium Risk, high usage	Actual	22717	10.88%	€157,588k	17.93%	€6,937.00	5.7%	4.4%	€6,965k	9.7%	8.93%	€ 30.57	€650.27	€ 301.33	198%	4.34%	44.64%
	Budget	23500	11.33%	€169,200k	18.69%	€7,200.00	3.7%	2.4%	€4,015k	7.7%	5.75%	€ 28.97	€442.97	€ 230.74	235%	3.20%	41.73%
	Variance	-3.3%	-0.44%	-6.9%	-0.75%	-3.7%	+2.01%	+2.05%	+73.48%	+2.05%	+3.18%	+5.52%	€ 207.30	€ 70.59		+1.14%	+2.91%
Accounts in Default	Actual	8915	4.27%	€55,407k	6.31%	€6,215.00	100.0%	70.3%	€38,951k	0.0%	5.60%	€ 67.16	€415.50	€ -4,017.94	8%	-64.65%	0.00%
	Budget	7400	3.57%	€41,810k	4.62%	€5,650.00	100.0%	62.0%	€25,922k	0.0%	5.73%	€ 62.47	€386.24	€ -3,178.24	9%	-56.25%	0.00%
	Variance	20.5%	+0.70%	32.5%	+1.69%	10.0%	---	+8.30%	+50.26%	+0.00%	-0.13%	+7.51%	€ 29.26	€ 839.70		-8.40%	---
TOTAL BOOK	Actual	208721	100.00%	€878,679k	100.00%	€4,209.82	9.6%	9.1%	€79,659k	9.2%	7.30%	€ 26.13	€333.36	€ 87.97	77%	-2.09%	-22.61%
	Budget	207450	100.00%	€905,423k	100.00%	€4,364.54	7.0%	5.3%	€47,736k	7.1%	6.82%	€ 24.16	€321.89	€ 53.29	123%	1.22%	17.18%
	Variance	0.6%	---	-3.0%	---	-3.5%	+2.58%	+3.79%	+66.87%	+2.14%	+0.48%	8.17%	€ 11.47	€ 141.26		-3.31%	-39.78%

- Analyse return by strategy
  - Concentrate on marginal cases
- Reconcile to portfolio budget
  - Concentrate on financials
- Strategy trades-off risk and reward
  - Keep strategies simple
    - <= 20 nodes!

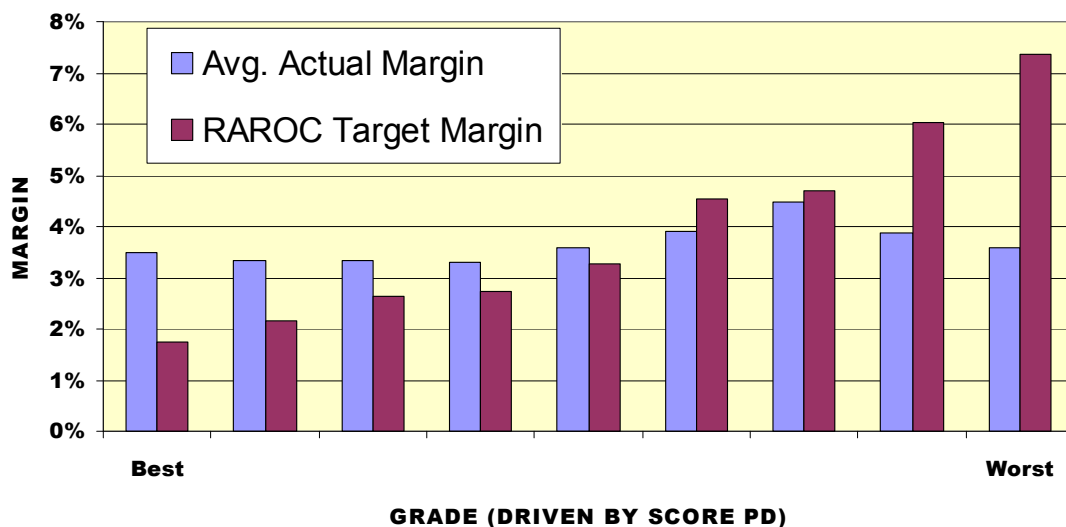
Conference paper: Speed Reading © Scoreplus SARL 2009

130



## Example: Network Pricing Behaviour

### Branch small business portfolio



**Use tracking to understand portfolio drivers**

Conference paper: Speed Reading © Scoreplus SARL 2009

131



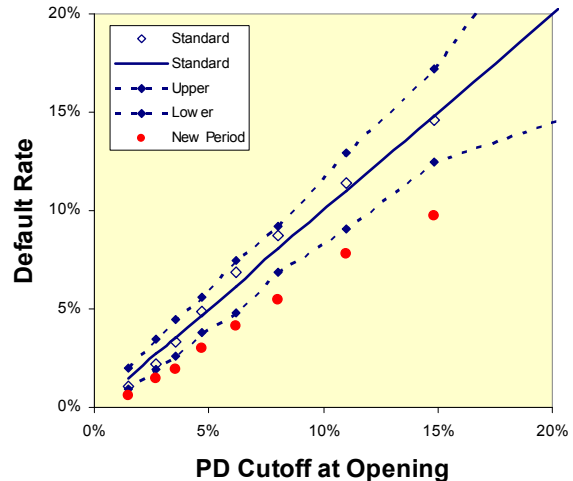


# Statistical Tests

## Why? What?

- Fast results = small samples
- Small samples = Uncertainty
- Statistical tests quantify certainty
- Margin for error around expectations ...
  - Confidence intervals
- Conclusion:
  - Data inconsistent with assumption
  - Must change cutoff

## Could the difference be random?



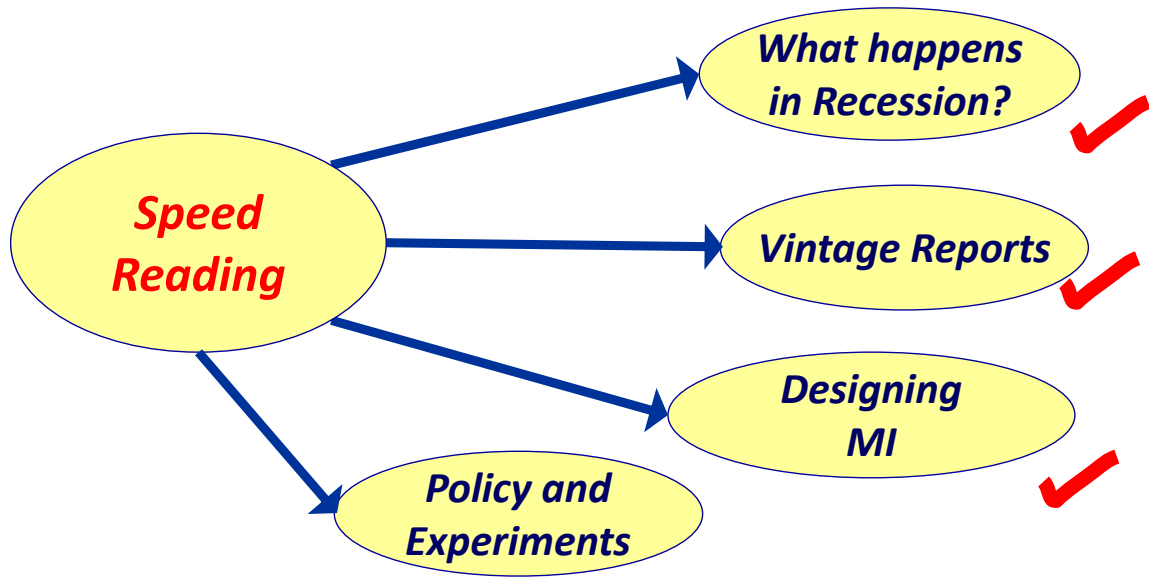
*Can you believe your eyes?*

# Report Design Criteria

- PD – not score
  - If scores didn't exist we wouldn't bother inventing them
- Focus on financials
  - Marginal Cases
  - RAROC measurement
- Early performance benchmarks
- Policies are more important than rating tools
  - Need to make policy assumptions explicit
- Statistical Tests

*Information Design ↔ Structure of Policies*

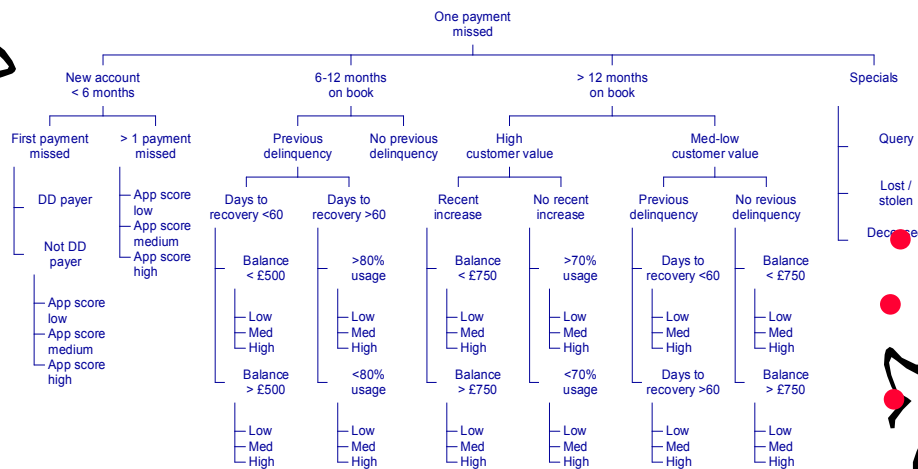
# Speed Reading: Structure of Presentation



**Using portfolio tracking in a recession**



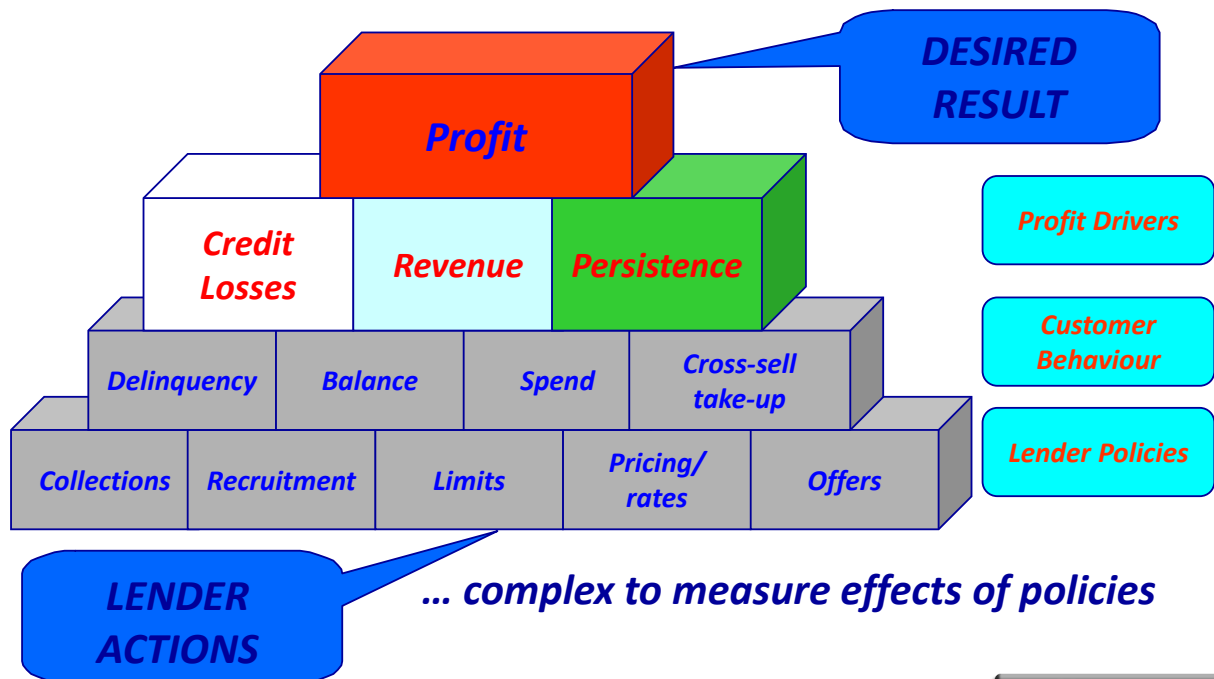
# Complexity: the enemy ... The decision bush



**Does complexity add value? Can you prove it?**



# Profit Pyramid: Difficult to see the top!



## What is a good policy?

- Based on portfolio analysis and experience
  - Discussed and analysed throughout business
- Quantified targets
- Measurable Results - Set standard for performance
- Coherent - Think through overall consequences

### Policy Elements

**Sources of Business**  
**Recruitment Strategy**  
**Acceptance Cut-off**  
**Pricing**  
**Override Procedures**

### Targets for Tracking

**Population Profile**  
**Override Level**  
**Acceptance Rate**  
**Default Rate**  
**EVA/Contribution Level**  
**Attrition Rate**

**Keep it Simple!**

# Credit Policy: Example

## Set scorecard cutoff for personal loans

### Inputs

- Tracking Results
  - Population Profile
  - Actual vs. Expected PD
  - Scorecard Model Performance
  - Policy Rule Evaluation
- Economic Outlook
  - Interest Rates
  - Unemployment
- Market Analysis
  - Competitors
  - Product Ideas

### Outputs

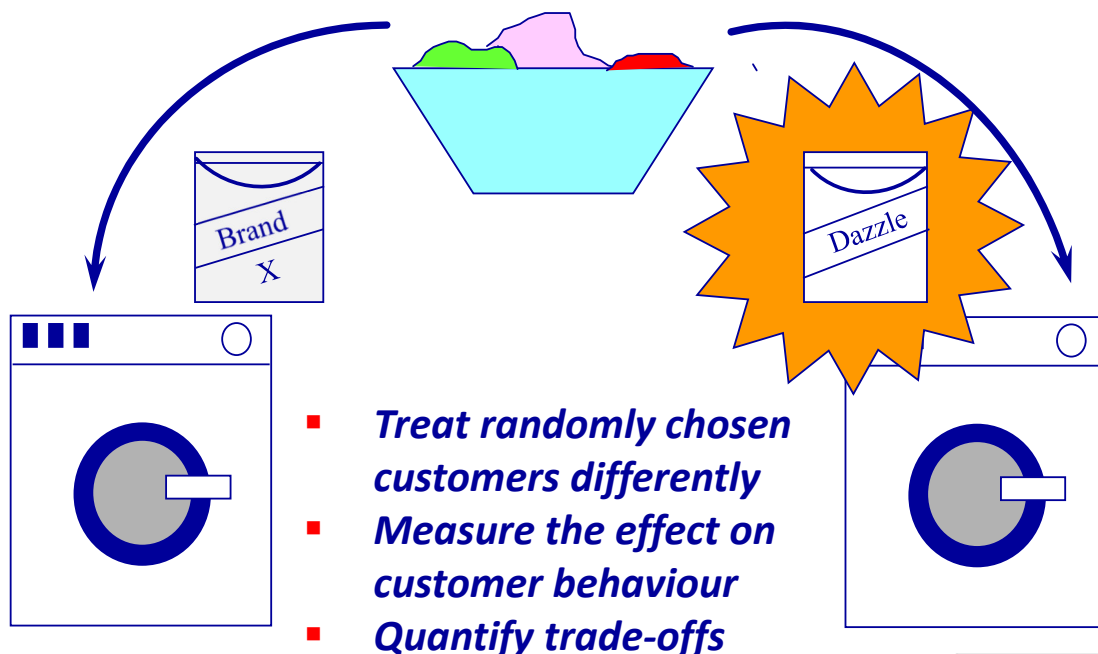
- Point in Time Assumptions
  - Reference PD
  - Scorecard Gini
- Operating Policies
  - Scorecard Cutoff
  - Pricing Policy
  - Lending Limits
  - Policy Rule changes
- Portfolio Budget
  - New Lending
  - Outstanding Balances
  - Expected Losses
  - Return on Capital
- Expected Tracking Results
  - See above

**Tracking →**  
**Learning →**  
**Change**



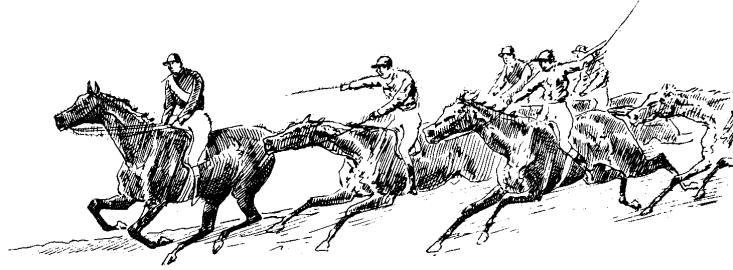
## Experiments

### Basic idea



# Original approach: horse race

## 1980s



- Champion: previous strategy - 80%
  - even if clearly inferior to new approach
- Challengers: new strategies - 20%
  - improve treatment for some customers
  - restrict treatment for others

**Wrong idea**

**Goal: Confirm existing ideas**

## Why champion-challenger doesn't work (most of the time)

- Horse race is fixed
  - Know the winner ahead of time
  - Demonstrating the obvious
- Purpose of experiment badly defined
  - Many experiments have no defined end-point
- Testing too many things at once
- Sample badly chosen - too big/small
- Failed experiments give little information
- Successful experiments don't help formulate next steps
  - One-shot approach

**Champion-challenger has slowed change**

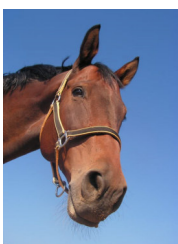
# Cost of Experiment: example

	Sample Size 50,000	Limit Increase €1,000	
		Goods	Bads
Bad Rate:	10%	45,000	5,000
Utilisation		3%	25%
Extra Balances		€1.35m	€1.25m
Margin		10%	-40%
Profit/Loss		€135k	-€500k

**Overall Cost of Experiment = -€365k**  
**= c. 8 analysts x 1 year**

**What return on this investment?**

## Better approach: horse breeding



- Systematically vary treatment
- Understand how customers react to different policy
- No single policy will be a winner for everyone:
  - identify customers for whom a given policy is most profitable
- “Cross” policies to create a champion
  - takes time to find best policy

**Experiments buy information – to add value to portfolio**

# Measuring Results of Experiments

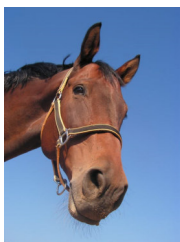
## Maximum Limit utilisation

	< 30%	30 – 59%	60 – 94%	95% +	
<b>PD</b>	8% +	-5%	-15%	-21%	-24%
	5 to <8%	+4%	+9%	+5%	-6%
	2 to <5%	+2%	+12%	+17%	+19%
	< 2%	+0%	+1%	+3%	+5%

- Measures difference in contribution after 9 months
  - limit increase vs. no limit increase
  - contribution = revenue – bad debt cost
- Evaluate for each cell – not on total population

**Build profit-maximising policies**

## Experimental design



- Champion:**
  - “best guess”
  - prudent
  - evolves with understanding
- Control:**
  - freeze champion
  - for duration of test
- Test:**
  - one dimension of policy
  - for all types of customers
- Example: increase limits**
  - How does customer behaviour react to limit increase?
    - Balances
    - Delinquency
    - Attrition

# Experimental design principles

- Analysis drives experiment
  - experiment is expensive
  - a last resort (when analysis can't give result)
- Most experiments should fail
  - "obviously" good ideas don't need experiment
- Maximum information for minimal exposure
  - keep test groups as small as possible
- Fixed time scale
  - Define end of experiment before start
- Unanalysed experiments deliver no value
  - think through analysis before starting test
- Experiments should be part of an ongoing process
  - Not a one-off idea ...

***Experiments are a means, not an end***

## Past vs. Future Management Process

### ***Past***

- Model Focus
- Rank-ordering of risk
  - Score only
- Number of cases
- Scores
- Measure total portfolio
- Once-off Experiments
- Sophistication = Complexity

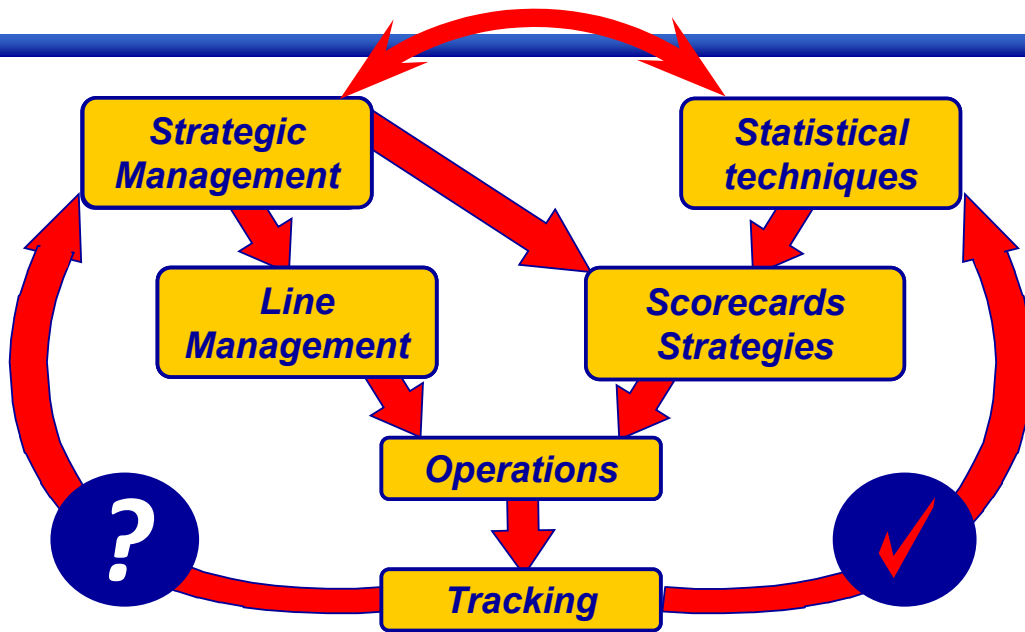
### ***Future***

- Portfolio and Policy Focus
- Accuracy of Estimates
  - PD and other
- Financials – Return on Capital
- PD, EL (and EAD, LGD)
- Concentrate on marginal cases
- Systematic ongoing testing
- Sophistication = Simplicity

***Technical Feedback -> Management Feedback***



# Leveraging the Feedback Loop



**Information: the key to competitive positioning**