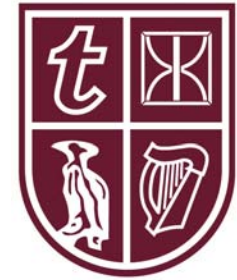


# InDCent Exposure



## Making DC Safer for Members

Eoghan Burns, Damian Fadden, David Harney

20 October 2009

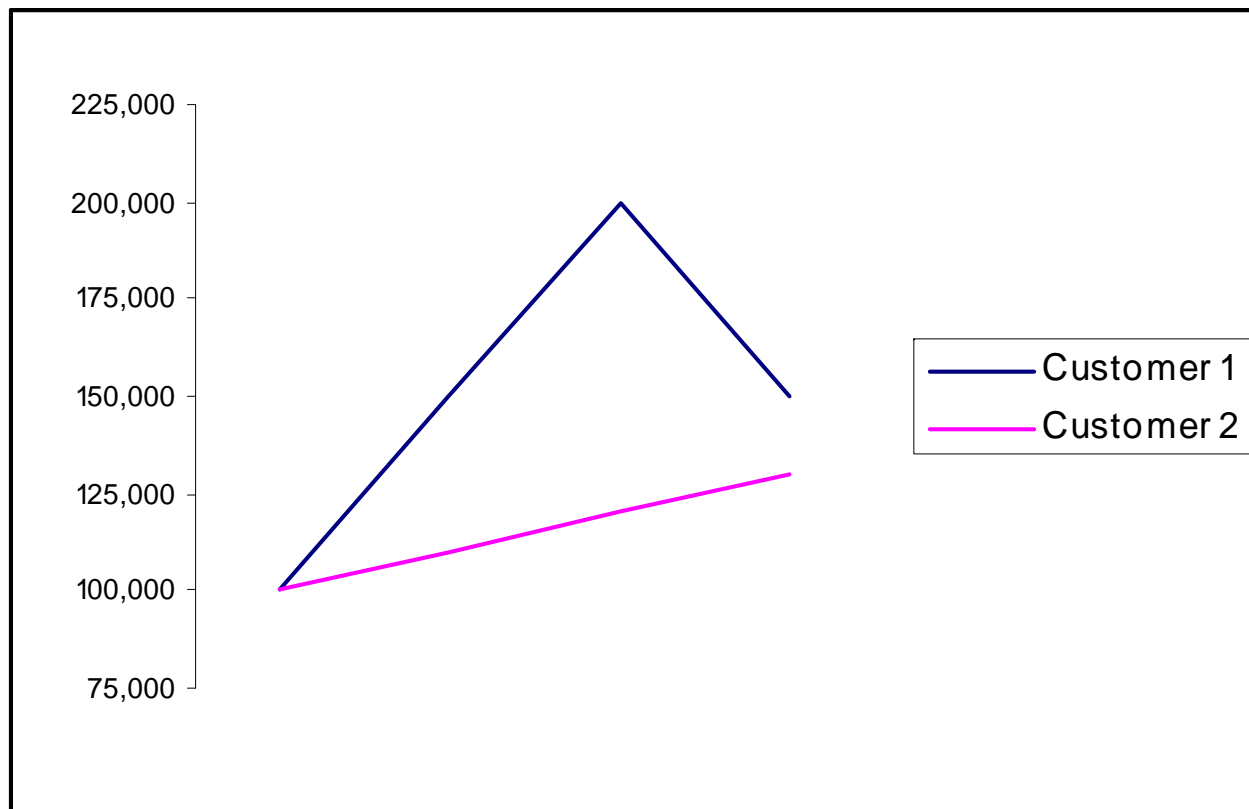
# Contents

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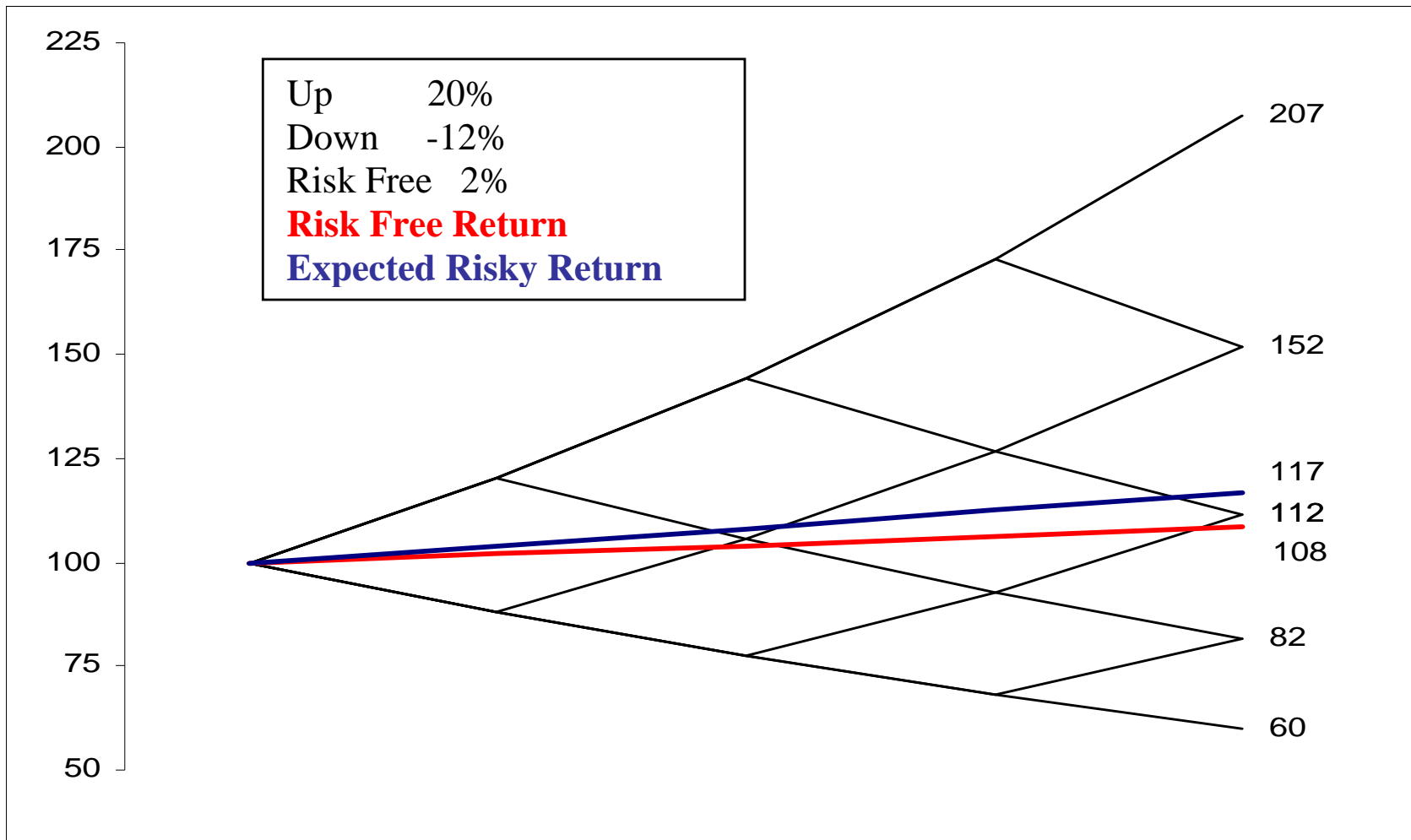


- Modelling Customer Satisfaction
- Predictable Pension Outcomes
- Customer Friendly Lifestyle Strategies

# Does intermediate information matter?



# Risky Asset and Safe Asset





# Simple Risk Constraint

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*“Probability of positive return must be greater than 66%”*

- Term 4 – Probability of positive return is 68.25%
- Term 1 – Probability of positive return is 50%

*But*

- Rule is arbitrary
- Rule ignores available information
- Term paradox is the **BIG** problem



# Utility Model of Customer Satisfaction

## MODEL

- $d$  is the difference between actual return and expected return
- Satisfaction from out-performance declines at fixed rate  $u$
- Dis-satisfaction from under-performance increases at fixed rate  $1/u$

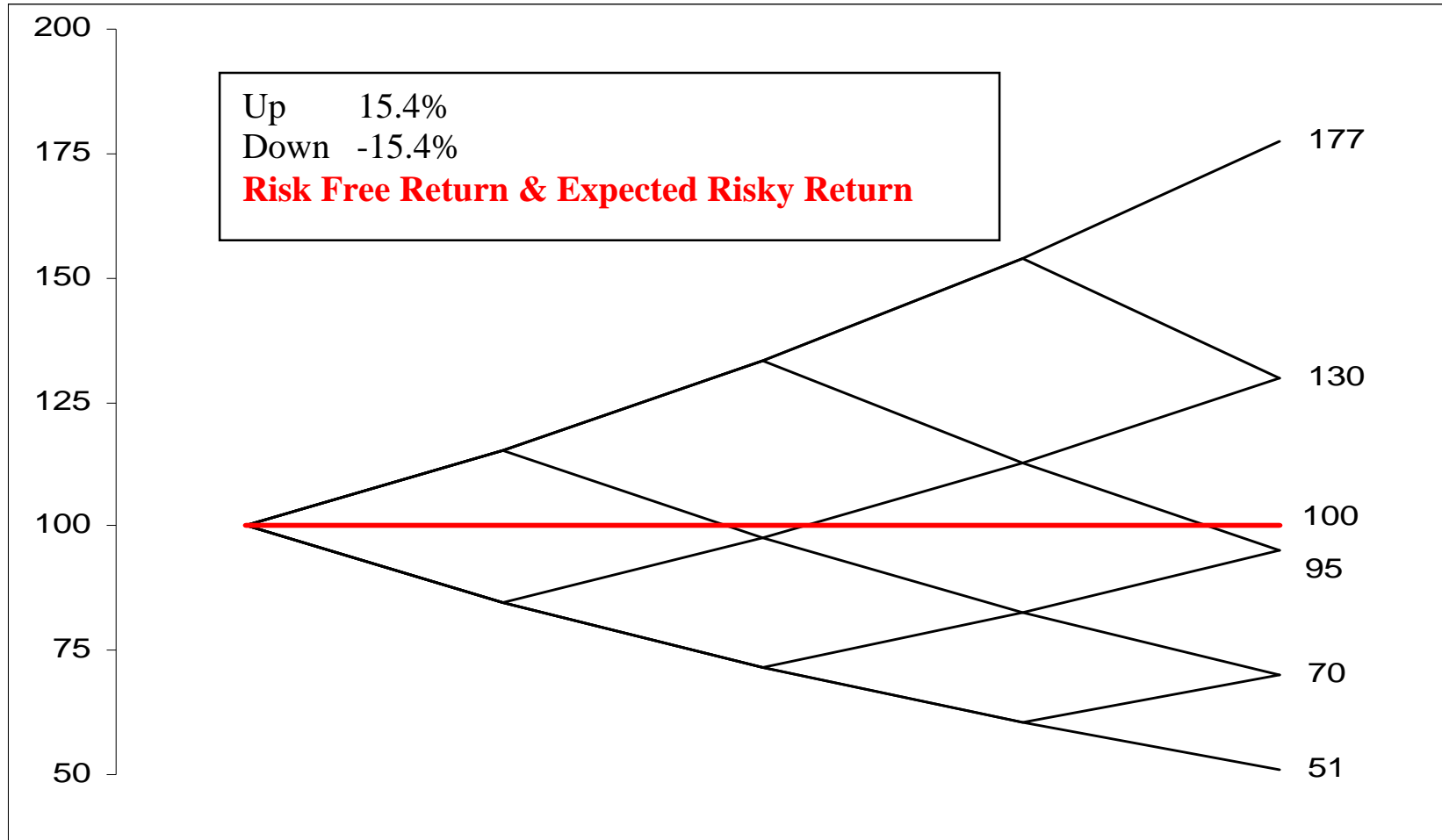
$$U(d) = \frac{u^d - 1}{\ln(u)}$$

<i>Actual Return</i>	<i>Expected Return</i>	<i>A - E</i>	<i>Utility Decay Rate - u</i>	<i>“Feels Like”</i>
-30%	10%	-36%	0.99	-44%
-10%	10%	-18%	0.99	-20%
10%	10%	0%	0.99	0%
30%	10%	18%	0.99	17%
50%	10%	36%	0.99	30%

## MARKET

- Expected return from risk-free asset is 2%
- For  $u = 0.984$ , a 20% positive return “feels like” a 15.4% out-performance
- For  $u = 0.984$ , a 12% negative return “feels like” a 15.4% under-performance

# Utility View of the World



***Term doesn't matter***



## Optimal Exposure to Risky Asset

$$R = \log_u \left[ \frac{s - b}{g - s} \right] * (1 + s) * \frac{100}{g - b}$$

*s=safe asset return*

*b=risky asset bad return*

*g=risky asset good return*

*u=utility decay rate*

For market average customer with utility decay rate of 0.984, **R = 50%**

- **R** depends only on customer utility decay rate
- Impossible to beat the 50/50 strategy
- “Clever” strategies won’t give better results





# Portfolio of Customers

Customer	Utility Decay Rate $u$	Utility from Safe Asset	Expected utility from Risky Asset	Optimal investment in risky asset $r$	Expected utility from Optimal investment
Obsessive worrier	0.97	0	-6.2	26%	1.0
Very concerned	0.975	0	-4.0	32%	1.2
Slightly concerned	0.98	0	-1.8	40%	1.5
Average	0.984	0	0	50%	1.8
Relaxed	0.99	0	2.73	80%	3.0
Very relaxed	0.995	0	5.3	160%	5.9
Doesn't care	1.000	0	8.1	Infinity	Infinity



# Emotional Customers Expecting Money Back

Customer	Utility Decay Rate $u$	Utility from Safe Asset	Expected utility from Risky Asset	Optimal investment in risky asset $r$	Expected utility from Optimal investment
Obsessive worrier	0.984	7.7	0.7	38%	9.2
Very concerned	0.987	7.8	4.2	41%	9.6
Slightly concerned	0.989	7.9	6.3	45%	9.9
Average	0.991	7.9	7.9	50%	10.4
Relaxed	0.995	8.1	12.1	90%	12.2
Very relaxed	0.997	8.1	14.1	170%	14.7
Doesn't care	1.000	8.2	21.4	Infinity	Infinity



# Pension Expectations

## 2% Real Return – Final Fund 6.5 x Salary

Salary	State Pension	Private Pension Lump Sum	Private Pension Annuity	Total Pension	Total Pension % Salary
€25,000	€12,000	€37,500	€6,250	€18,250	73%
€50,000	€12,000	€75,000	€12,500	€24,500	49%
€75,000	€12,000	€112,500	€18,750	€30,750	41%
€100,000	€12,000	€150,000	€25,000	€37,000	37%

## 0% Real Return – Final Fund 4.6 x Salary

Salary	State Pension	Private Pension Lump Sum	Private Pension Annuity	Total Pension	Total Pension % Salary
€25,000	€12,000	€37,500	€4,000	€16,000	64%
€50,000	€12,000	€75,000	€8,000	€20,000	40%
€75,000	€12,000	€112,500	€12,000	€24,000	32%
€100,000	€12,000	€150,000	€16,000	€28,000	28%

# Section Summary

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- Increasing risk aversion approaching retirement is justification for life-styling
- Projections should assume fund growth equals salary inflation
- TFSL of  $1.5 \times \text{Salary}$  and annuity of  $25\% \times \text{Salary}$  is a realistic target



# Predictability of Pension Outcomes

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- DC Pension Expectations?
  - Uncertainty is enormous
  - Life-styling viewed as giving away upside
  - Predictability needed as retirement approaches
  - Risk definition determines investment strategy

# Simple Monte Carlo Model - 30 year old

## Chances of missing pension target



	(1)	(2)	(3)	(4)	(5)	(6)
<b>Pension Replacement Ratio</b>	<b>100% Equities</b>	<b>100% Risk-Free</b>	<b>Managed Fund (66% Equities, 34% risk-free)</b>	<b>100% Equities switching to Risk-Free over last 5 Years</b>	<b>100% Managed Fund switching to Risk-Free over last 5 years</b>	<b>100% Managed Fund switching to Risk-Free over last 10 years</b>
< 30%	15%	100%	12%	15%	14%	15%
< 36%	22%	100%	23%	23%	25%	28%
< 38%	24%	100%	27%	25%	30%	34%
Mean	96%	28%	61%	83%	56%	50%
Median	64%	28%	51%	59%	48%	45%



# Same test for 64 year old

	(1)	(2)	(3)	(4)
<b>Pension Replacement Ratio</b>	<b>100% Equities</b>	<b>100% Risk-Free</b>	<b>Managed Fund (66% Equities, 34% risk-free)</b>	<b>25% Equities, 75% Risk-Free</b>
< 30%	5%	0%	0%	0%
< 36%	24%	0%	17%	1%
< 38%	32%	0%	30%	16%
Mean	42%	39%	41%	40%
Median	42%	39%	41%	40%

# Need Predictability

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- Planning as retirement approaches
- Contribution variability impacts disposable income
- Lose confidence – reluctance to make appropriate funding decisions
- Possible decisions at each review:
  - Accept changed outcome
  - Change contributions
  - Ignore/head in sand





# Framework of model

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- Series of reviews of funding position at 40, 50, 55, 60 and then annually
- Projected Pension Replacement Ratio (PRR) calculated at each review
- Predictability Test

**Projected PRR no worse than 10%  
lower than PRR at last review**

# Results of Projection Fixed Contributions



Strategy	(1)	(2)	(3)	(4)	(5)	(6)
	Equities	Fixed Interest	Managed (66% Equities, 34% Risk-Free)	Managed Fund switching over last 5 years	Managed Fund switching over last 10 years	High Equity Switching over 25 years

Model used: TSM by Deloitte calibrated as at 31/12/2008

# Results of Projection Fixed Contributions



Strategy	(1)	(2)	(3)	(4)	(5)	(6)
	Equities	Fixed Interest	Managed (66% Equities, 34% Risk-Free)	Managed Fund switching over last 5 years	Managed Fund switching over last 10 years	High Equity Switching over 25 years
<b>Age 40</b>	21%	52%	19%	23%	25%	30%
<b>50</b>	45%	40%	14%	44%	44%	45%
<b>55</b>	43%	2%	38%	38%	38%	30%
<b>60</b>	43%	22%	39%	39%	34%	28%
<b>61</b>	29%	1%	23%	20%	5%	5%
<b>62</b>	41%	2%	35%	25%	4%	3%
<b>63</b>	38%	6%	34%	14%	2%	2%
<b>64</b>	34%	12%	31%	4%	4%	4%
<b>65</b>	29%	0%	22%	0%	0%	0%

Model used: TSM by Deloitte calibrated as at 31/12/2008

# Results of Projection Fixed Contributions



Strategy	(1)	(2)	(3)	(4)	(5)	(6)
	Equities	Fixed Interest	Managed (66% Equities, 34% Risk-Free)	Managed Fund switching over last 5 years	Managed Fund switching over last 10 years	High Equity Switching over 25 years
<b>Avg fail rate over all ages</b>	36%	15%	32%	23%	17%	16%
<b>Median pension % salary</b>	51%	33%	51%	47%	45%	45%
<b>Total cost as % salary</b>	506%	506%	506%	506%	506%	506%

Model used: TSM by Deloitte calibrated as at 31/12/2008

# Results of Projection Variable Contributions



Strategy	(1)	(2)	(3)	(4)	(5)	(6)
	Equities	Fixed Interest	Managed (66% Equities, 34% Risk-Free)	Managed Fund switching over last 5 years	Managed Fund switching over last 10 years	High Equity Switching over 25 years
<b>Age 40</b>	3%	6%	2%	3%	3%	5%
<b>50</b>	15%	3%	10%	10%	11%	12%
<b>55</b>	29%	2%	18%	19%	19%	13%
<b>60</b>	37%	0%	28%	29%	24%	17%
<b>61</b>	26%	0%	19%	16%	4%	3%
<b>62</b>	37%	0%	28%	19%	3%	2%
<b>63</b>	36%	2%	28%	11%	2%	1%
<b>64</b>	34%	9%	29%	3%	3%	2%
<b>65</b>	29%	0%	22%	0%	0%	0%

Model used: TSM by Deloitte calibrated as at 31/12/2008

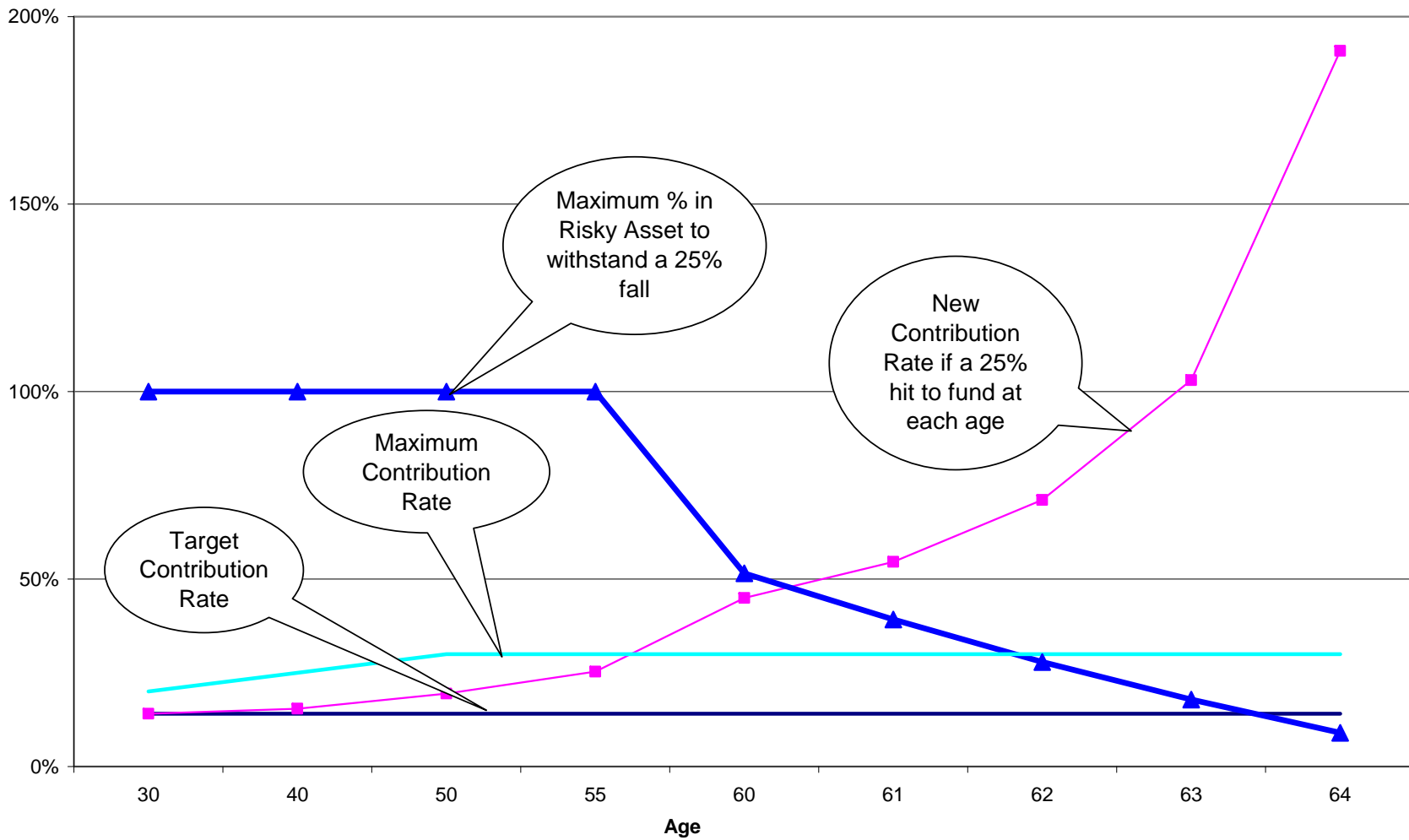
# Results of Projection Variable Contributions



Strategy	(1)	(2)	(3)	(4)	(5)	(6)
	Equities	Fixed Interest	Managed (66% Equities, 34% Risk-Free)	Managed Fund switching over last 5 years	Managed Fund switching over last 10 years	High Equity Switching over 25 years
<b>Avg fail rate over all ages</b>	27%	3%	20%	12%	8%	6%
<b>Median pension % salary</b>	48%	39%	46%	42%	41%	41%
<b>Total cost as % salary</b>	442%	644%	441%	456%	467%	462%

Model used: TSM by Deloitte calibrated as at 31/12/2008

# “Rule of Thumb” method



# Section Summary

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- DC benefit uncertainty is enormous – impossible to fully eliminate
- Strategies risk significant disappointment without ‘Life-styling’
- Effective targeting requires contribution flexibility – easier said than done!
- Modelling supports high equity holding at younger ages...
- ... but equities should be reducing at least ten years from retirement



# Customer Friendly Lifestyle Strategies

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- Definition of 'risk'
- Appropriate benefit targets
- Accumulation fund
- De-risking
- Retirement benefit targeting
- Stakeholder roles
  
- Summarise overall key themes



# Definition of Risk

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- Currently too much focus on fund price volatility?
  - Term is too short
  - Misdirected anxiety
  - Inappropriate behaviours
  - Ignores funding gap – the core challenge facing DC?
- Change to ‘Variability in benefits achieved vs target’
  - Supports realistic target setting
  - Supports member engagement
  - Adapts to time horizon
  - Incorporates funding level and flexibility
  - Target can reflect broader personal circumstances



# Benefit Targeting

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- DB style targets are pervasive but unrealistic given prevailing funding levels
- Ensures disappointment
- Reduces likelihood of true customer engagement
  
- State benefits are generous – take into account
- TFLS of 1.5 x Salary and annuity of 25% x Salary is a realistic target
  
- Priority order on benefits – tax free cash, then pension, then balance



# The 'Accumulation' Fund

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- Managed funds currently out of favour
- Could respond by moving to lower volatility fund mix
  - Long term impact on return?
  - Inflation protection?
  - Impact on risk under proposed definition?
- Or by switching focus to risk management, especially as retirement approaches
  - De-risking programme
  - Benefit targeting
- Make-up of managed funds is important, but a separate debate



# De-Risking

- Current lifestyle/target date offerings do not separate de-risking and benefit targeting
  - Five years too short for de-risking
  - Five years probably makes sense for benefit targeting
- Where to invest ‘de-risked’ money
  - Limited downside – 10% maximum fall? – with inflation protection
  - Mostly cash, fixed and inflation-linked bonds, low equity/alternative?
- De-risking within fund vs separate ‘de-risk’ pot – presentational/psychological advantages?

- Simplified example
  - €100,000 fund
  - 60% ‘normal’ equity mix
  - 45% ‘de-risked’ equity mix
  - 25% equity drop
  - Same total, different presentation

	Before	After
One fund approach	€100,000	€88,750
Two fund approach		
Fund A	€75,000	€63,750
Fund B	€25,000	€25,000
Total	€100,000	€88,750



# Approaching retirement - targeting

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- Gradual move to appropriate benefit matching funds
  - Lump sum – Cash?
  - Annuity – annuity match
  - ARF – Managed fund / lower risk fund
- Reflect individual detail
  - Likely benefit mix
  - Personal retirement date
- Rebalance to reflect data changes
  - Salary
  - Retirement date
  - Funding level



# Stakeholder Roles

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- **Providers**
  - More tailored and effective risk management services
  - Identify poor investment choices within schemes
  - Improve communication – limited impact is no excuse
- **Trustees**
  - Adopt considered position on investment default and choice
  - Close member investment management as retirement approaches
- **Advisors**
  - Broaden investment conversation – risk management
  - Members want guidance



# Stakeholder Roles

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- **Regulators**
  - Recommend use of lifestyle for default?
  - ARF for DC
  - Change projection basis to no excess return over salary increase
- **Employers**
  - Appropriate scheme set-up and reasonable contribution are a given
  - Be aware of likely pension outcome in overall context
  - Build in behavioural triggers? – contribution matching, save more tomorrow
  - Financial education as part of employee development goals
- **DC Members**
  - Take ownership!



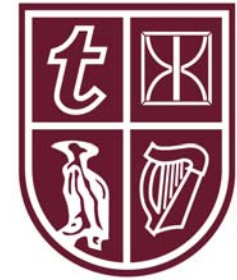


# Conclusions

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- Risk appetite
  - Decreases as retirement approaches => case for life-styling
  - Modelling shows case for equity investment
  - But also for de-risking well before retirement
  - Decide what we mean by 'risk'
- DC outcomes are hugely uncertain
  - Realistic targeting can help
  - Funding and investment must be considered together
  - Five years too short for de-risking
- Much more tailored targeting phase is possible
  - Priority order of benefits
  - Dynamic response to changing variables
  - Individual circumstances of DC member
- Possible actions for the Society
  - Lobby for regulatory changes to require use of lifestyle default
  - Project fund growth = salary inflation

# InDCent Exposure



## Making DC Safer for Members

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20 October 2009