

# Valuing the New Zealand Student Loan Scheme

## the \$6 billion question

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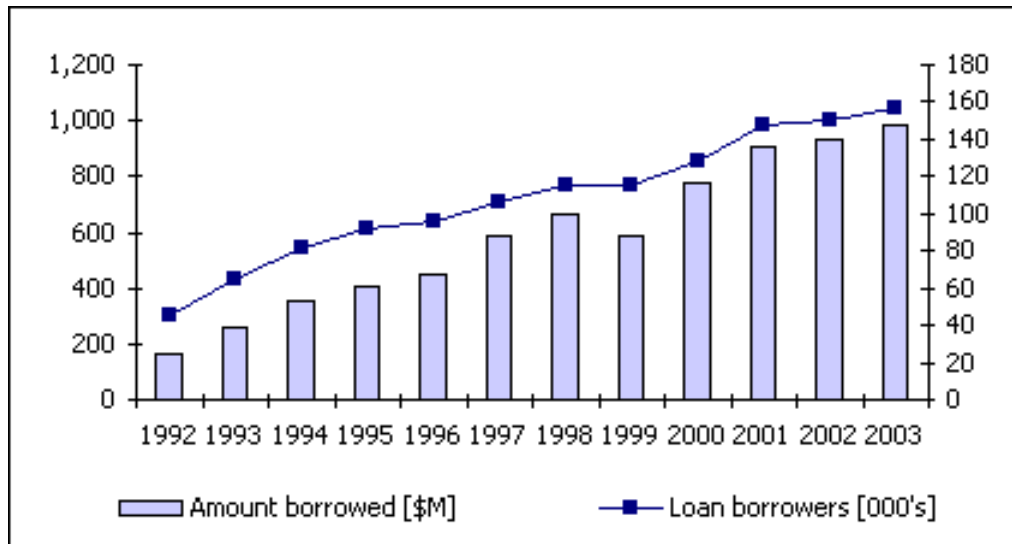


# The Student Loan Scheme

## Basic Facts and Rules

## Student Loans Scheme – basic facts

	2003	2000	Ave Incr.[p.a]
Number of loan borrowers	156,250	128,107	5.1%
Amount borrowed [\$M]	\$988	\$776	6.2%
Average Amount borrowed	\$6,316	\$6,058	1.0%



## Student Loan Scheme – basic facts

Student Loan Debt [June 2004]	\$6.0 billion
Student Loan Borrowers with IRD [June 2004]	418,761
Average Student Loan Balance with IRD [June 2004]	\$14,424
1/2 of the students with loan balance under \$10,000	
2/3 of students with loan balance under \$15,000	
88% of students with loan balance under \$30,000	
Average Loan Repayment Time	9.3 years

## Student Loan Scheme – the rules of:

- "loan eligibility"
- borrowing
- loan repayments
- Interest/debt write-offs

# Student Loan Scheme – who is borrowing what?

## The three loan components:

Course fee  
Living cost  
Course-related cost

## Proportion on all borrowings:

60%  
30%  
10%

## Five provider types

Universities  
Polytechnics  
Private Training Establishments  
Colleges of Education  
Wananga

52%  
23%  
20%  
3%  
2%

Female loan borrowers

in 1992

in 2003

46.3%

58.4%



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# The Need for Analysis and Data Integration

# The increasing need for analysis

## Main issues:

- Increasing overall Student Loan Debt
- Student Loan Repayment Times
- Possible socio-economic implications of the Student Loan Debt

## Actions required:

- To increase the mid to long term forecast accuracy
- To enhance modelling /costing capabilities
- To test and evaluate policy initiatives and their implications

# Data integration

The Auditor-General's report -

"The Student Loan Scheme - Publicly Available Accountability Information"

Among the report's recommendations was a proposal that Statistics New Zealand undertake a trial integration of selected datasets relating to the Student Loan Scheme with a view to providing statistics to inform strategic policy, financial risk management, financial reporting and forecasting.

Feasibility report to the Minister - May 2001

The three sources of the data are:

- data on each individual's tertiary education and demographic characteristics, sourced from the **Ministry of Education**
- data on borrowing provided by the **Ministry of Social Development (StudyLink)**;
- data on student loan debt levels and on income from **Inland Revenue**.

## Data integration

The integrated dataset - created in 2002

Contains matched data for the years 1997 to 2000 inclusive,

together with some unmatched data on debt and income for the years 1992 to 1996.

The first release of information from the integrated dataset occurred on 10 December 2002.

It had been intended that the dataset be updated annually with a further year's data from each of the three source agencies.

Because of problems with the management of the dataset, no update occurred in 2003.

The 2004 update will add two years' data - 2001 and 2002 - to the dataset.

The 2003 data is expected to be added during 2005.

Eventually, each year's data will be added to the dataset with a lag of eighteen months.

## The increasing need for analysis

TESLA [Infometrics, 1995]

- Micro-simulation model [gauss]
- based on data distributions
- no time series

SLIM [PwC, 2003]

- Based on actual loan borrowers dataset
- based borrowers actual data
- using individual borrowers actual data series

Two versions of the model:

the Full version

Stats NZ Datalab

the Cut-down [aggregated] version

Desktop version at MoE

## All Student Loan Scheme related information is available:

On the Ministry of Education website: [www.minedu.govt.nz](http://www.minedu.govt.nz)  
including the latest:

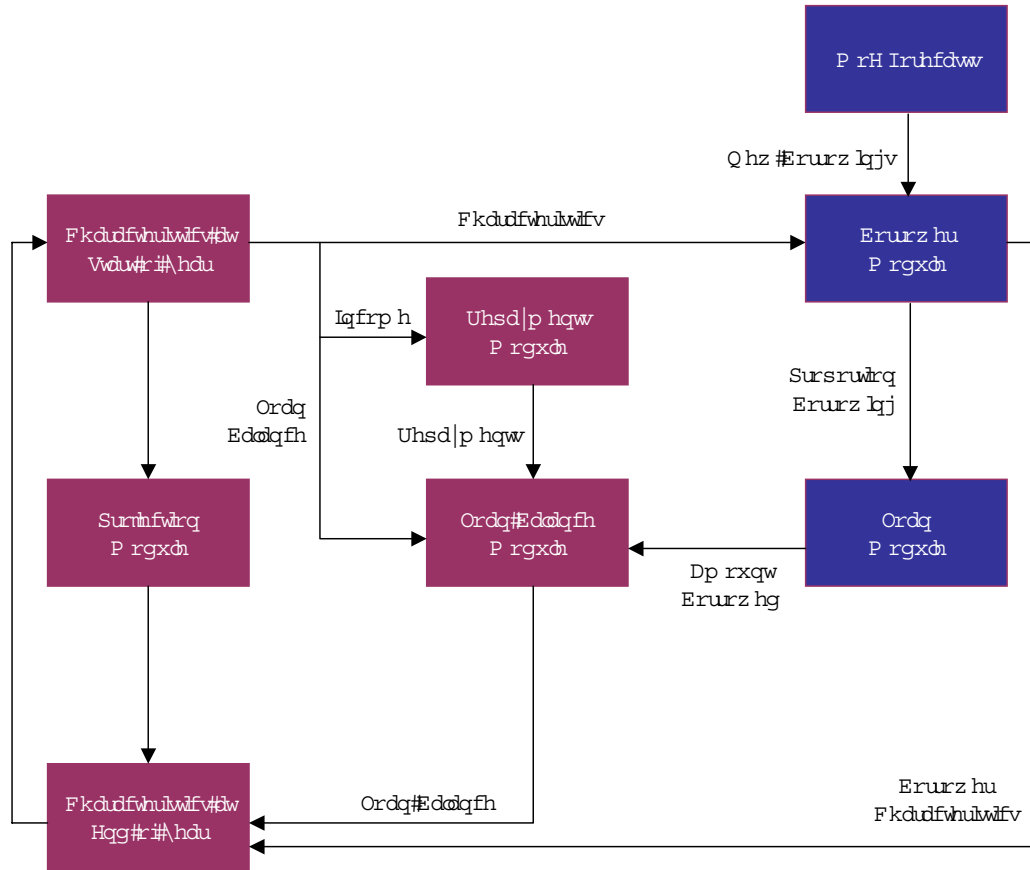
STUDENT LOAN SCHEME ANNUAL REPORT Incorporating the Financial  
Statements to 30 June 2004



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# Model Structure

# The model



## Multi state model

- Expected to result in more stable set of assumptions and base structure
- Allows for transition rates to be adjusted



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# The Projection Module

## State definitions and the current state profile

<u>State</u>	<u>Description</u>
1	Enrolled and Earning
2	Enrolled but not Earning
3	Not Enrolled and Earning
4	Delinquent
5	Not Enrolled and not Earning
6	Overseas

## State definitions and the current state profile

<u>State Description</u>	<u>Number</u>	<u>Percentage</u>
Enrolled and Earning	116,709	49%
Enrolled but not Earning	9,441	4%
Not Enrolled and Earning	88,965	37%
Delinquent	3,150	1%
Not Enrolled and not Earning	12,096	5%
Overseas	7,038	3%

# Valuation methodology - transitions

“Future”

“Starting” Transition State

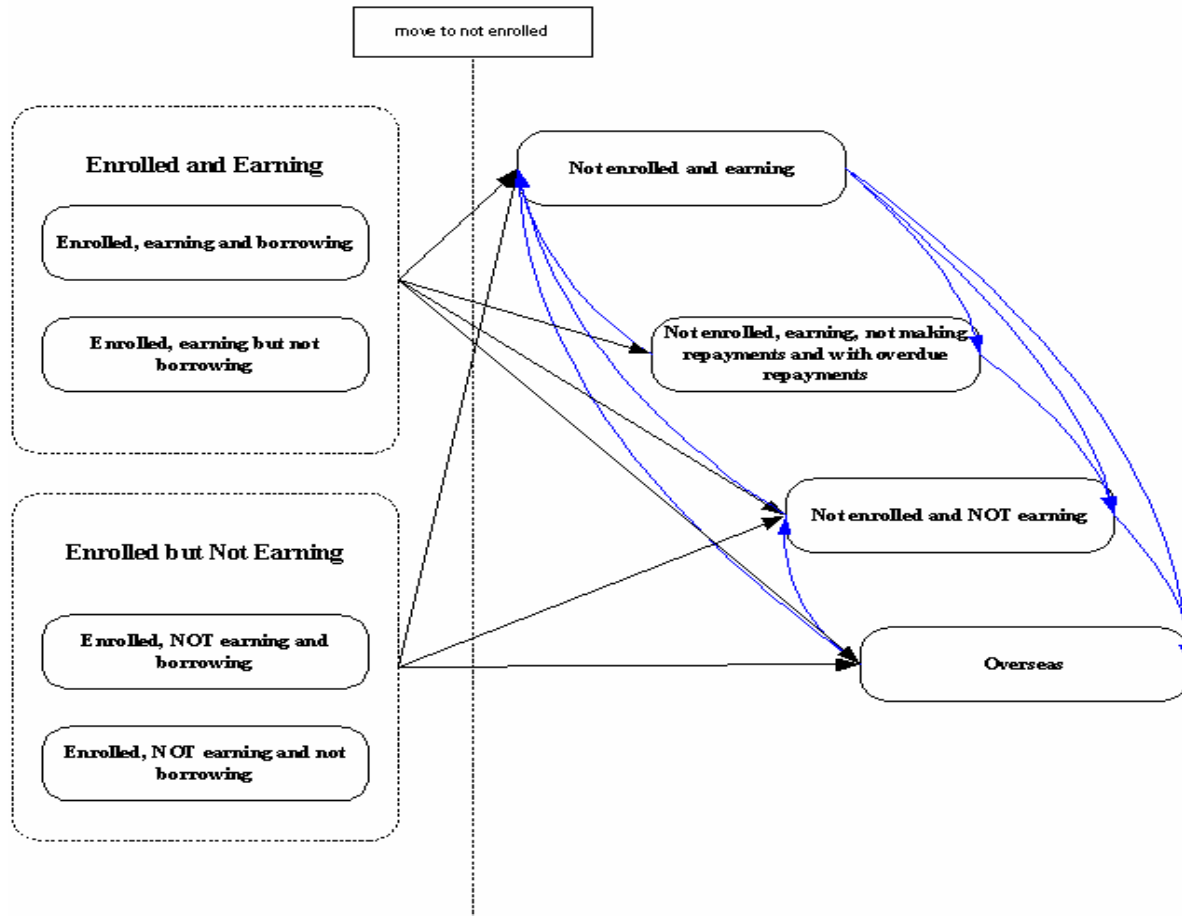
Transition State

1  
2  
3  
4  
5  
6

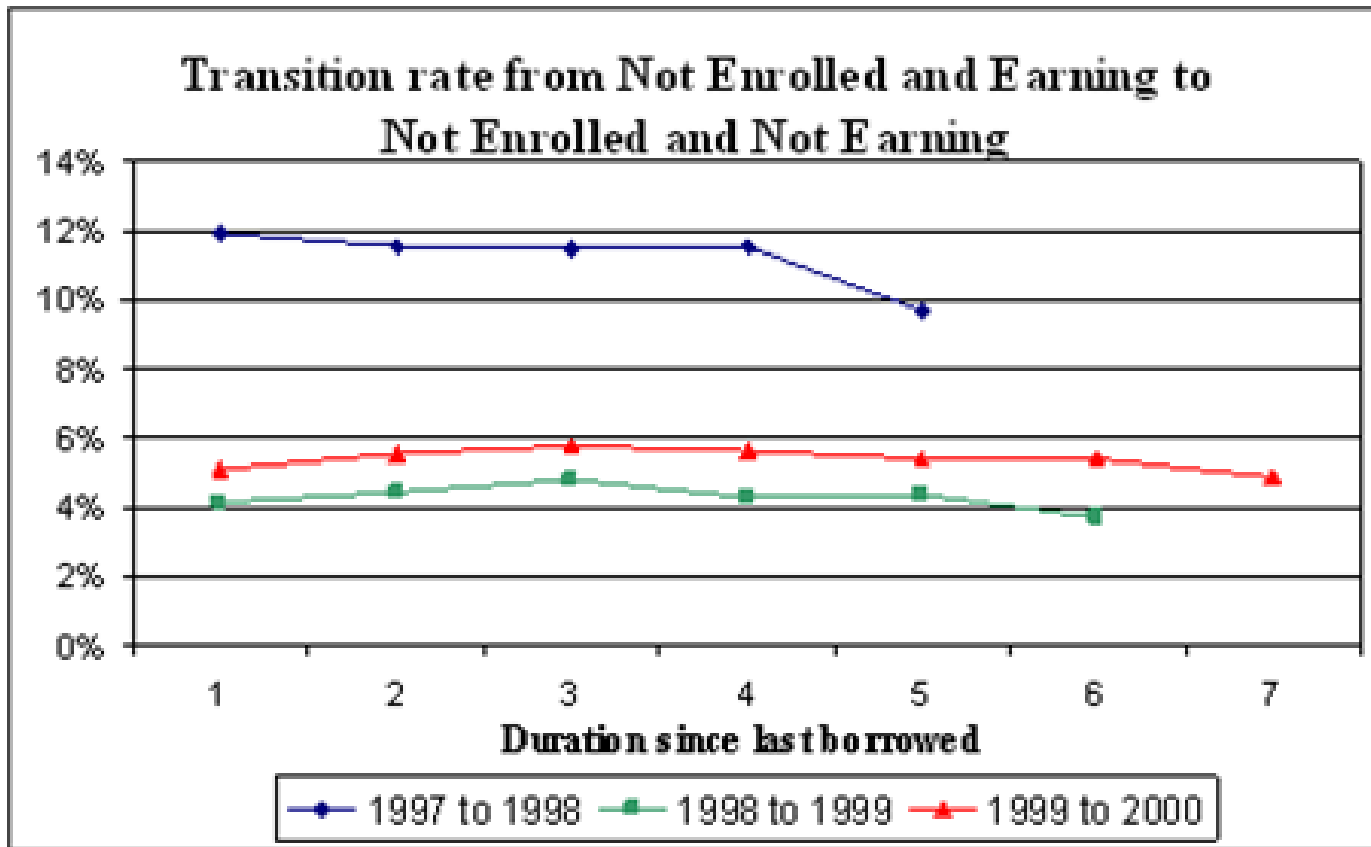
	1	2	3	4	5	6
1						
2						
3						
4						
5						
6						

For each cell above an assumption is needed for the rate at which borrowers migrate from a starting state to a future state.

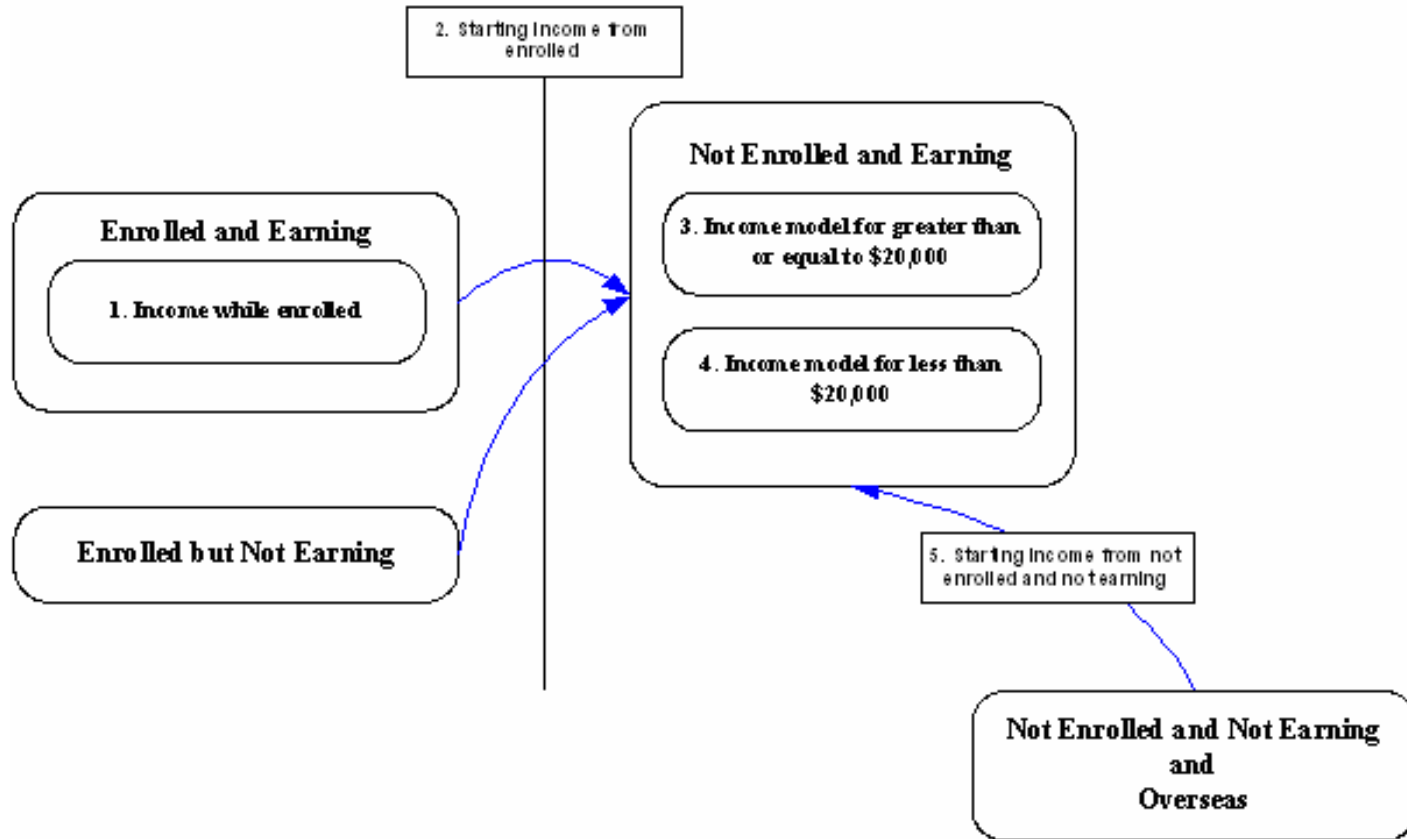
# Valuation methodology - transitions



## Data used



# Valuation methodology - incomes



## Valuation methodology - incomes

Dependant variable options –

- Income earned in the next year; or
- Increase in income from this year to next year

Need for distribution of incomes around mean



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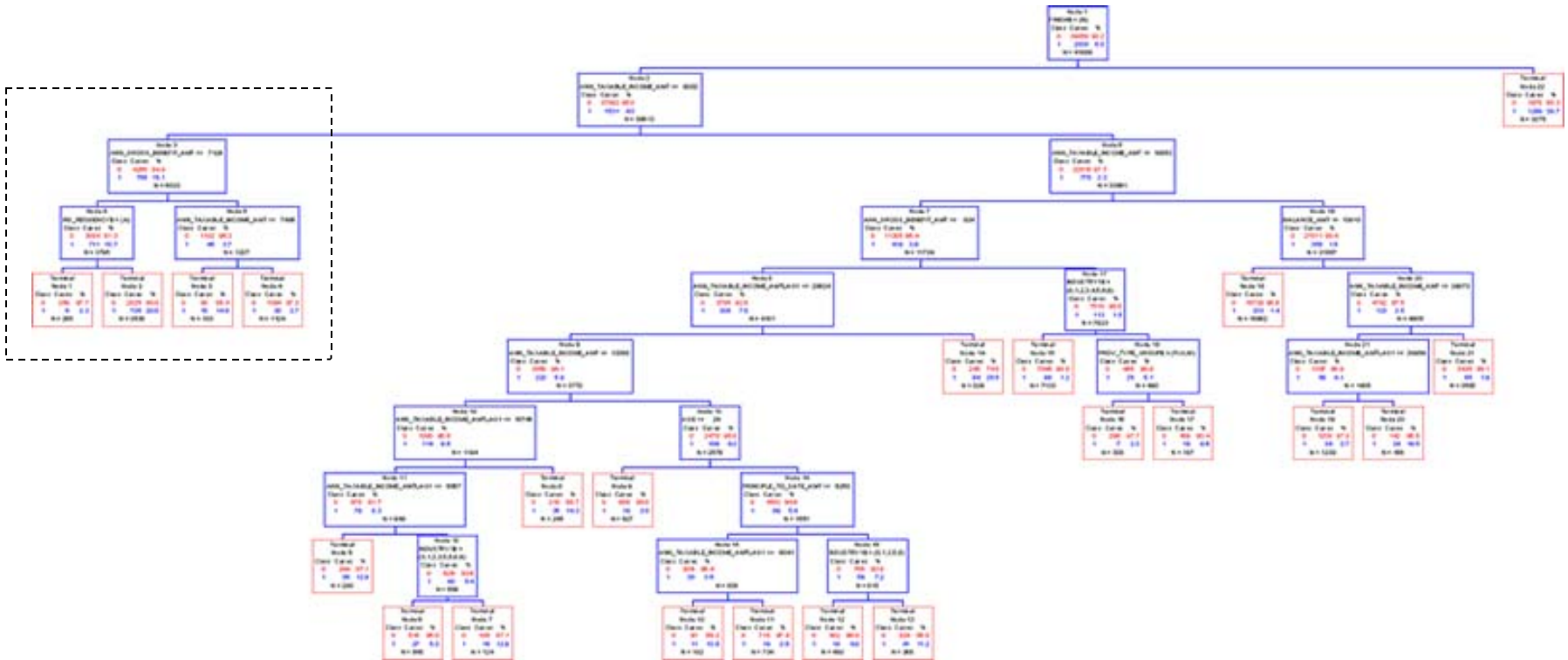
# Modelling Methodology



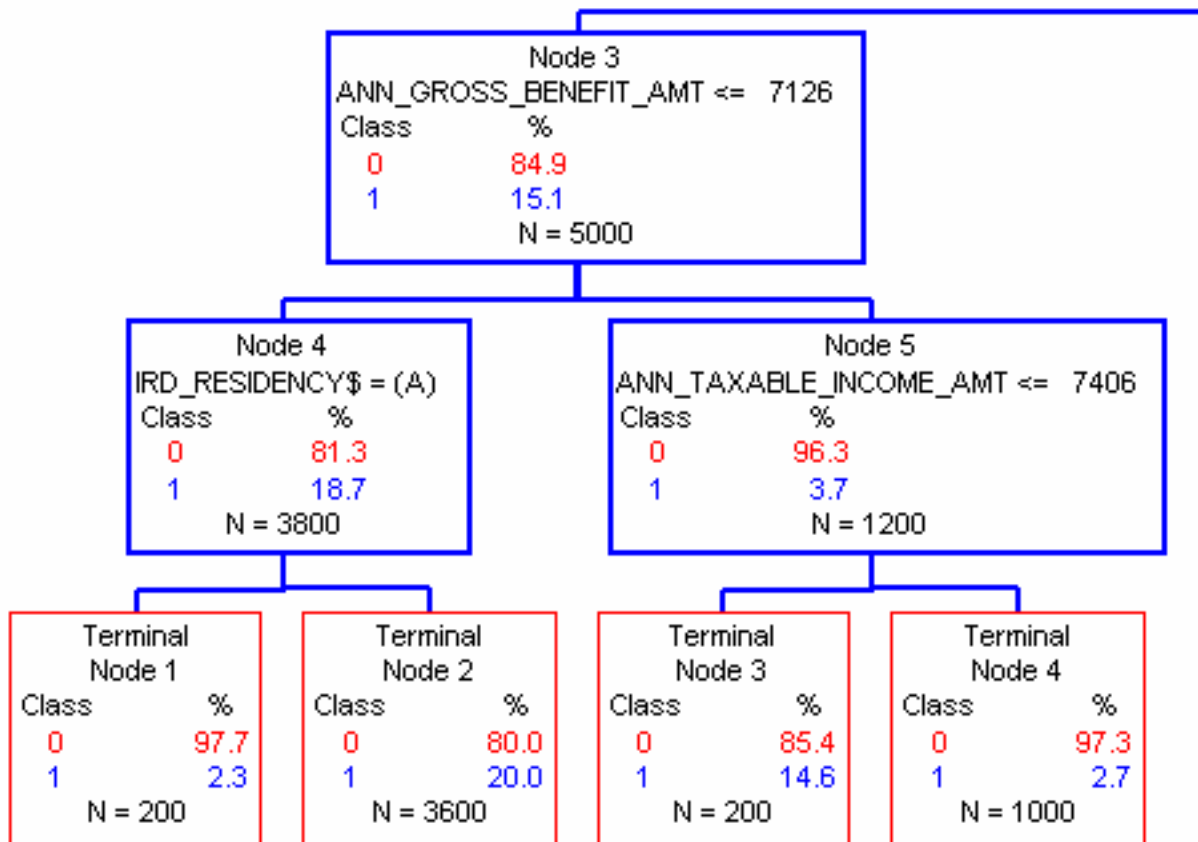
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# Classification and Regression Trees - CART



# Classification and Regression Trees - CART





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# Non-modelled Assumptions

## Non-modelled assumptions

Discount rate

Salary inflation

Interest rate charged

Threshold increases (CPI inflation)

Tax

Incomes more than 7 years after first borrowing

Expenses

Mortality and bankruptcy

## Discount rate

Discount rate	= Risk free rate + Debt margin
Debt margin	= Expected default loss + Risk premium
Risk free rate	- from government bond rates
Expected default loss	- already incorporated in valuation
Risk premium	- from data on US bonds

## Risk premium

Find expected default loss by running model with and without

- Death
- Bankruptcy
- Overseas and not repaying
- Delay in repayment

Find Risk premium from curve fitted to data  $RP = 1.5507\sqrt{EDL}$

At 30 June 2004

Expected default loss = 0.31% p.a.

Risk premium = 0.86% p.a.



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# Valuation Process



## Overview of the valuation methodology

Project student loan borrowers in each state over the future

- Take existing borrowers
  - Project forward with transitions
- 
- Determine annual incomes for each future year, given state
  - Calculate repayment obligations based on incomes
    - Determine any voluntary repayments, or those not repaying obligation
    - Gives series of cash flows
  - Inflate, roll forward and discount cash flows
  - Gives overall valuation result!!



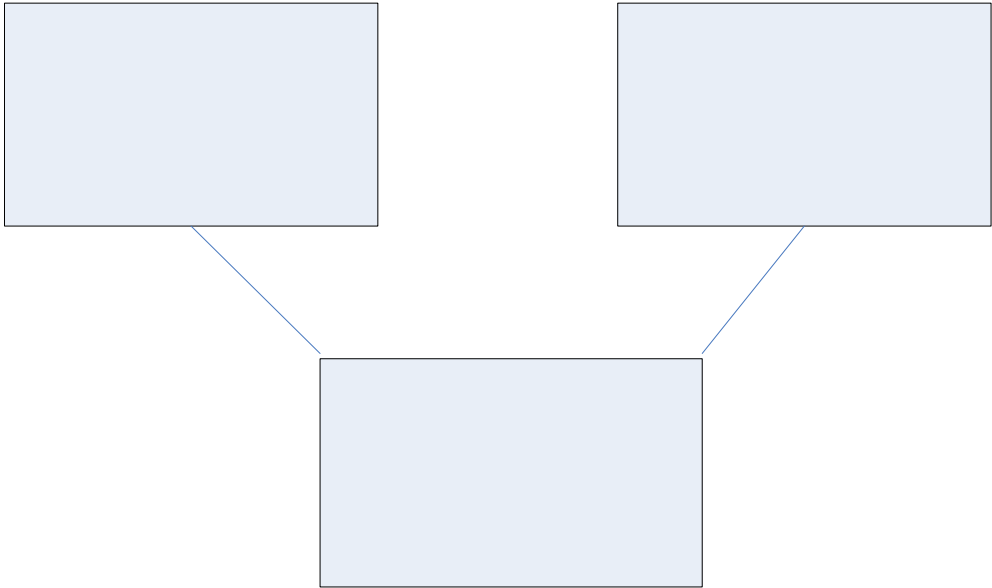
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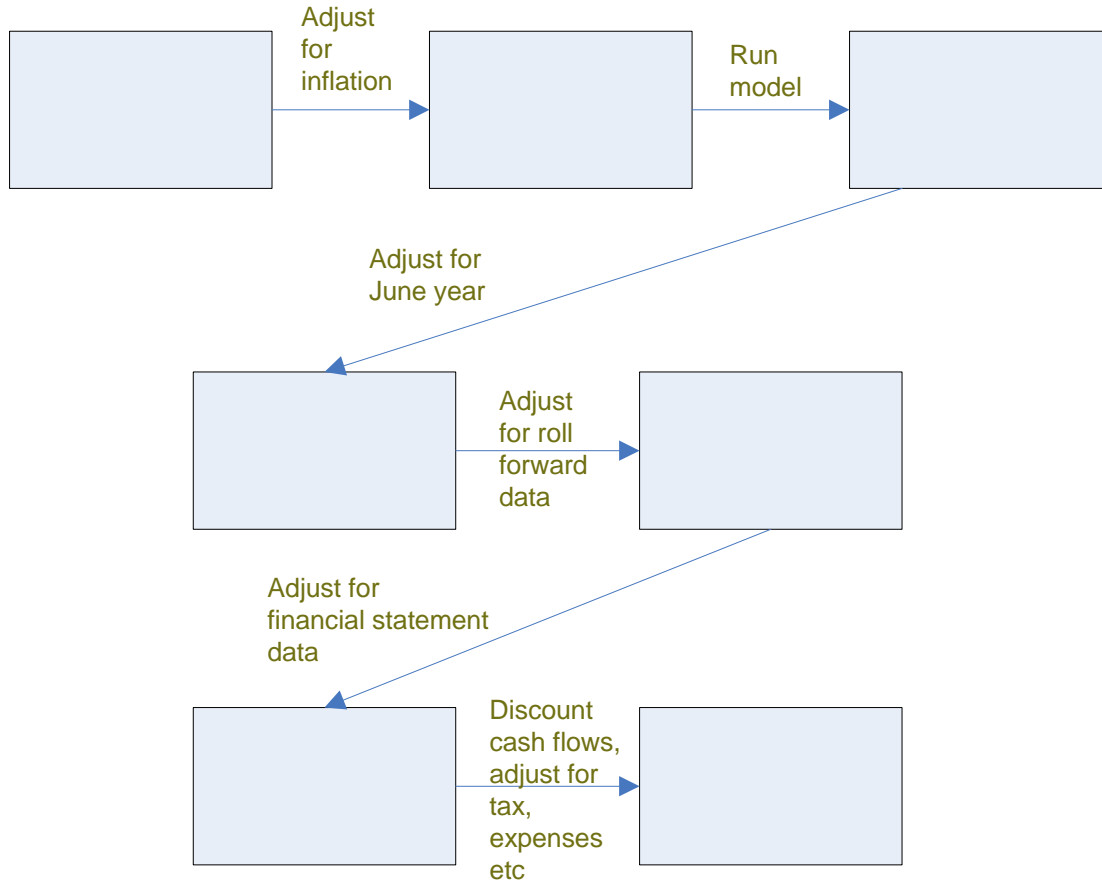
# Roll Forward



# Roll forward needed



# Roll forward and valuation process





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# The End