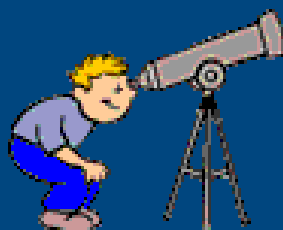




# Australian Population and Policy Simulation Model (APPSIM)

CAGP/Chinese State Information Centre Working Visit



Assoc Professor Simon Kelly  
22-23 September 2009

# History

- Treasury *Intergenerational Report* highlighted policy changes coming
- Model required to look at equity issues
  - Modelling underlying the IGR is at an aggregated level
  - New modelling capacity required to assess:
    - the distributional impact of future changes
    - the inter-generational redistributive impacts
    - the likely capacity to pay of different groups
- Dynamic microsimulation provides both aggregate and distributional outcomes

# APPSIM

- 5 year project, started in late 2005
- First prototype due early 2010
- Funded by the ARC and 12 Commonwealth Govt agencies
- Similar to SESIM (Sweden), DESTINIE (France), MOSART (Norway), DYNACAN (Canada), PENSIM (UK)



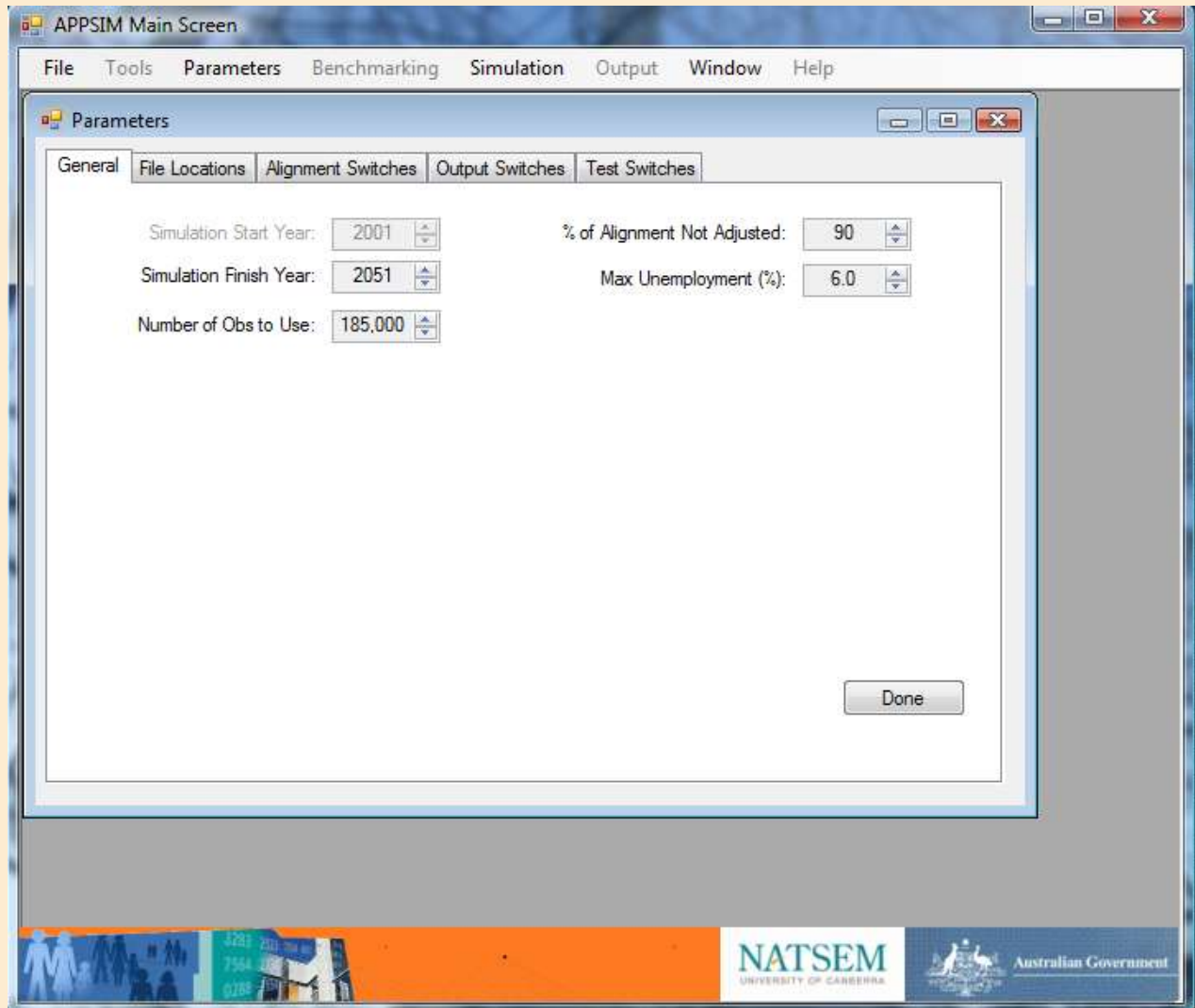
# APPSIM – what it does

- Provides a snapshot of the population and government programs each year
- Base data is Australian 2001 Census one per cent sample file (188,000 people)
- Full population model, individuals being aged to about 2050; discrete yearly time unit
- Panel data being used to estimate transition probabilities
  - Seven years of data, 7 000 households, sample size problems
- Alignment used to match ABS population projections and Treasury labour force projections

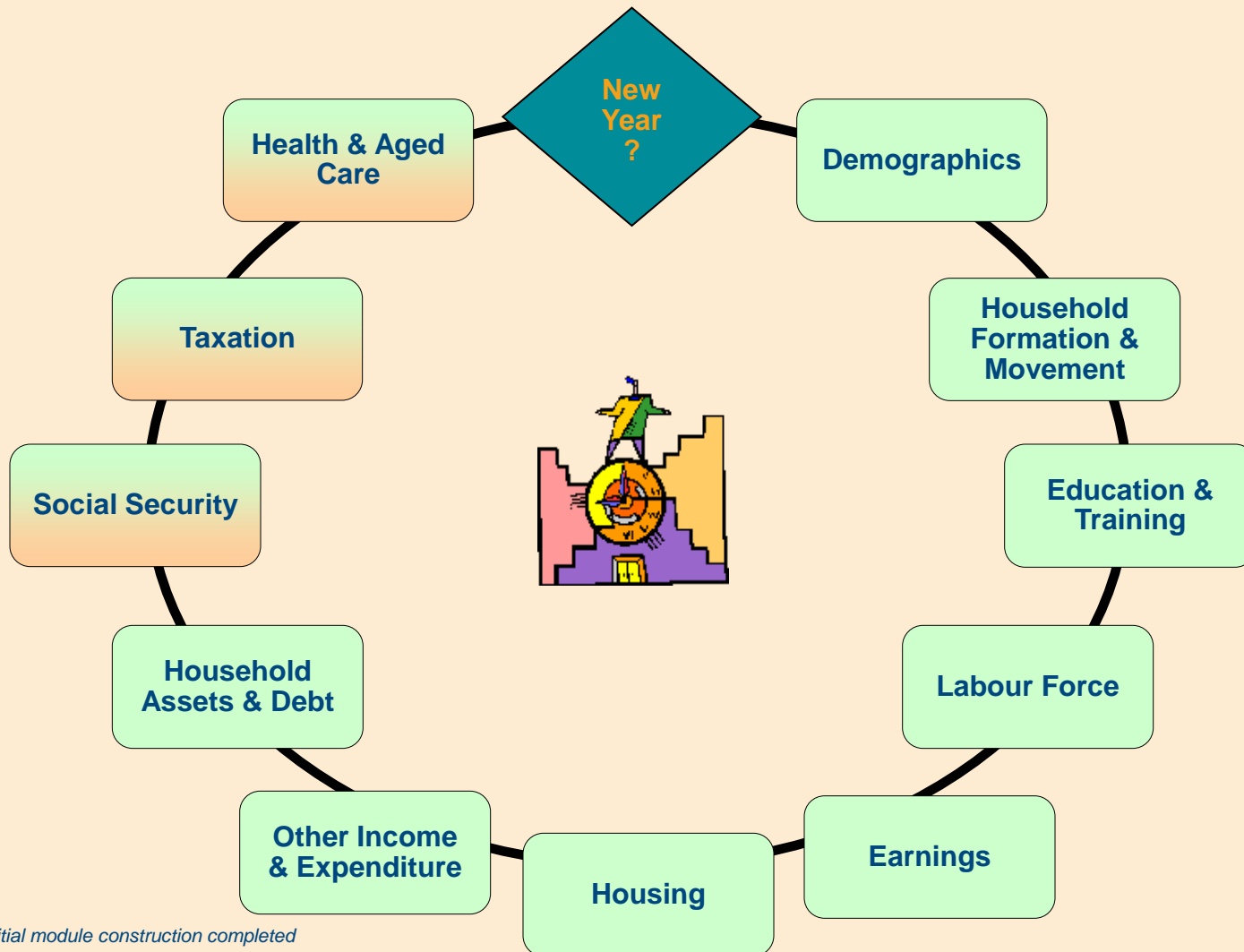
# The Overall Simulation Steps

- Set the parameters
  - Accept / change input parameter defaults
  - Turn Alignment on/off
  - Select types of output required
- Run the simulation
  - Simulation uses the parameters set above
  - Simulate each event based on appropriate probabilities, equation parameters and alignment data
  - Information is output during the simulation
    - Detailed databases
    - Summary statistics
- Analyse the output

# Parameter Screen



# Processes being modelled within APPSIM



*Green shading denotes initial module construction completed or well underway*

# Simulation Running

The screenshot shows the 'APPSIM Main Screen' window with a menu bar (File, Tools, Parameters, Benchmarking, Simulation, Output, Window, Help) and a central area displaying simulation parameters and results. The parameters are:

Year:	2043
Pop:	27,219,984
Births:	245,520
Deaths:	235,848
Labour Force:	14,900,088
Avg earnings (per week):	\$4,519.00

Below the parameters, a blue button displays the result: "Year: 2043 Proportion Aged 65+: 22.0%". Below that, a white button displays "Running Education Module".

The bottom of the window features a footer with logos for NATSEM (University of Canberra) and the Australian Government, along with a small graphic of stylized human figures and numbers.





# Examples of the use of APPSIM



# Some illustrative policy options

- **Scenario 1**

- Increase minimum pension age from 65 to 67yrs

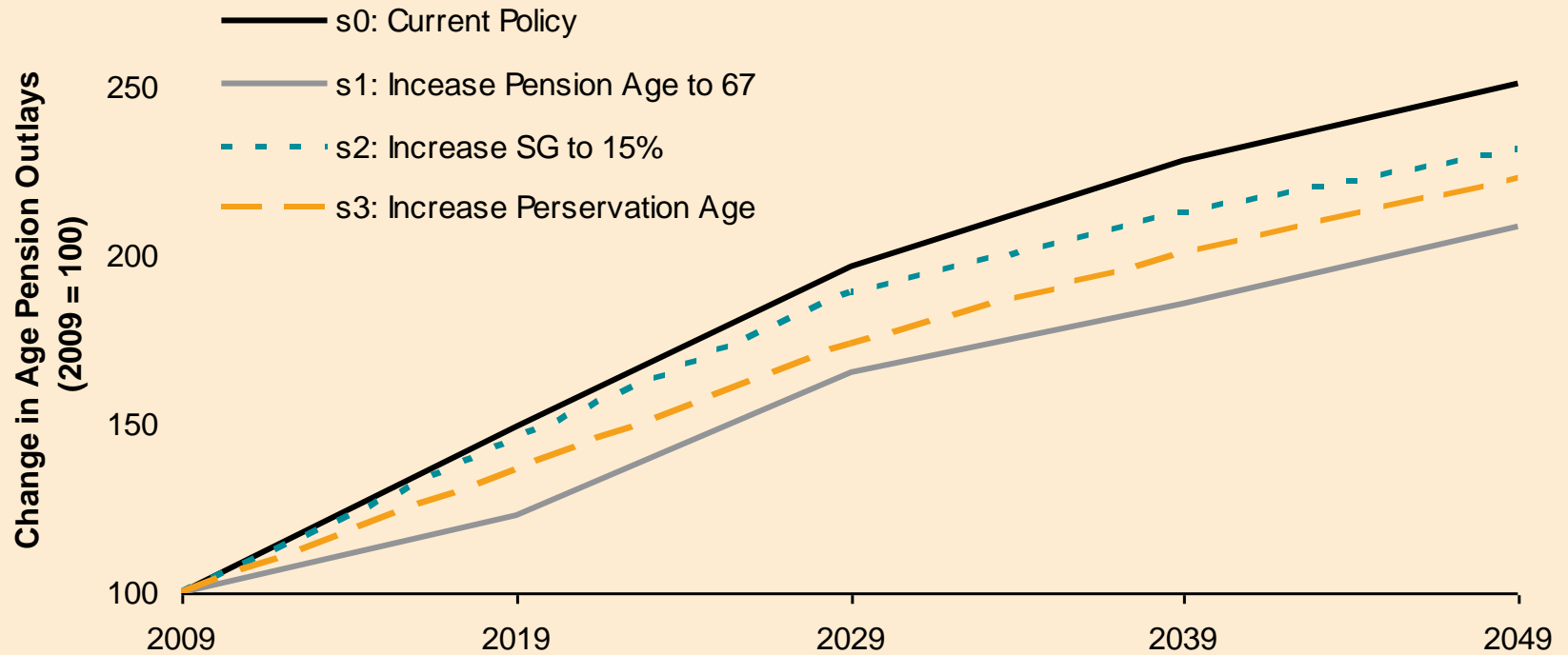
- **Scenario 2**

- Increase the compulsory superannuation contribution rate from 9% to 15%

- **Scenario 3**

- Increase the superannuation preservation age from 55 to 60yrs

# Preliminary projected changes in government outcomes



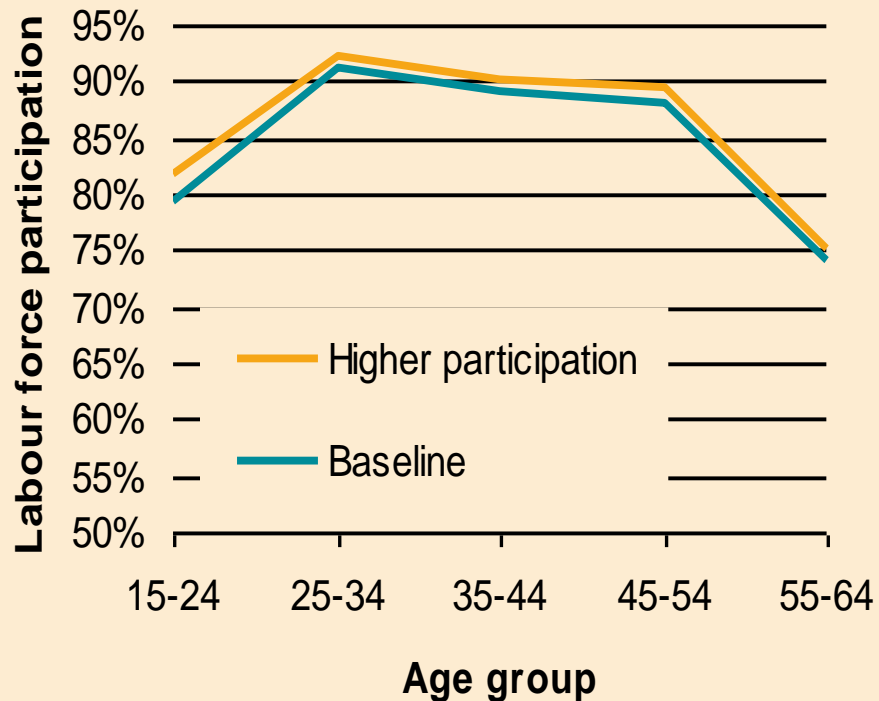
NOT FOR QUOTATION, Experimental projection output only, APPSIM still under development, February 2009

# More illustrative examples

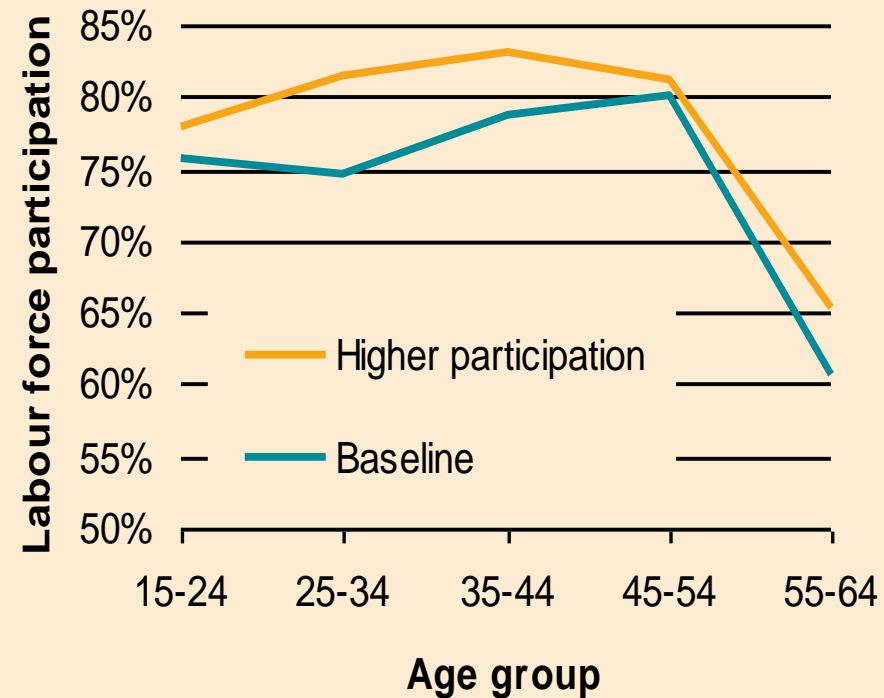
- **Scenario 1**
  - Increasing overall labour force participation by 5%
- **Scenario 2**
  - Reducing disability among 45-64 year olds by 3%
- **Scenario 3**
  - Impact of the global financial crisis on superannuation
- **Scenario 4**
  - Projections of hospital cost under an ageing population

# 5% increase in participation - 2043 outcome

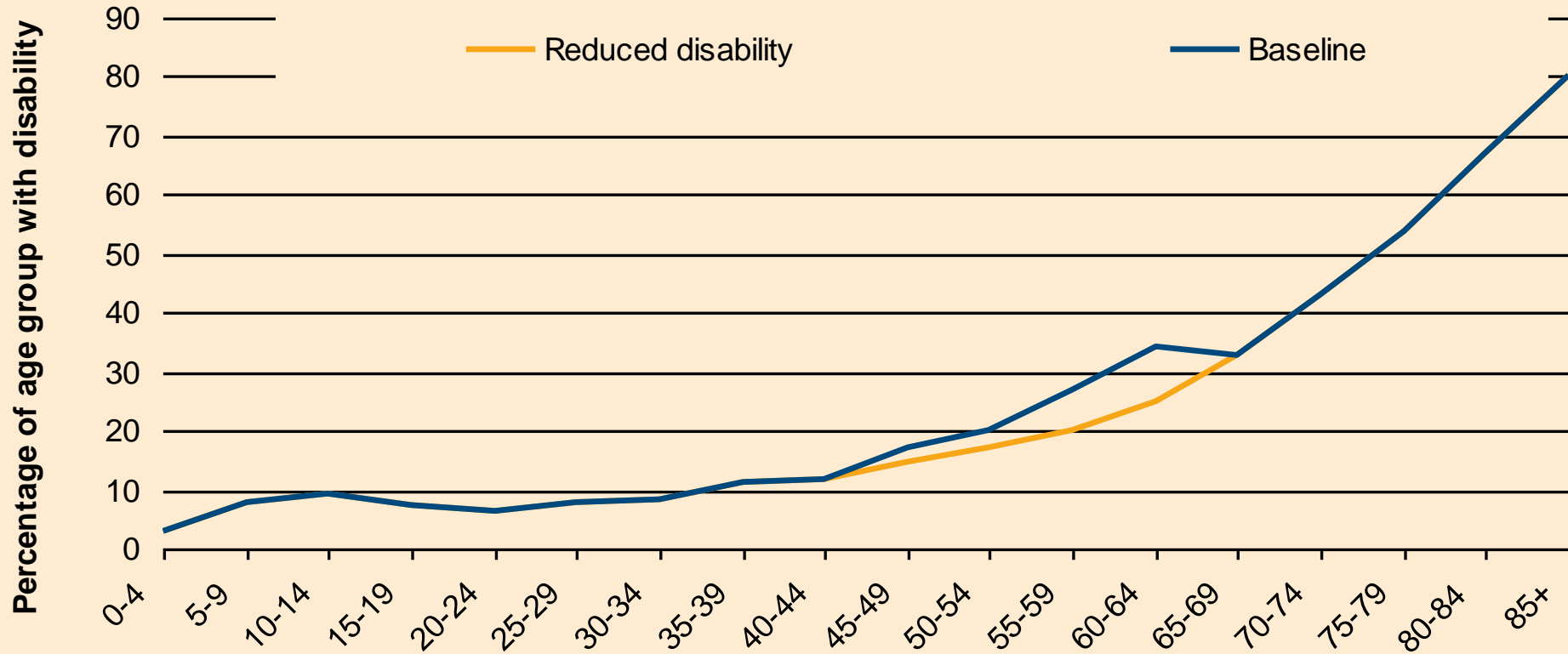
## Males



## Females

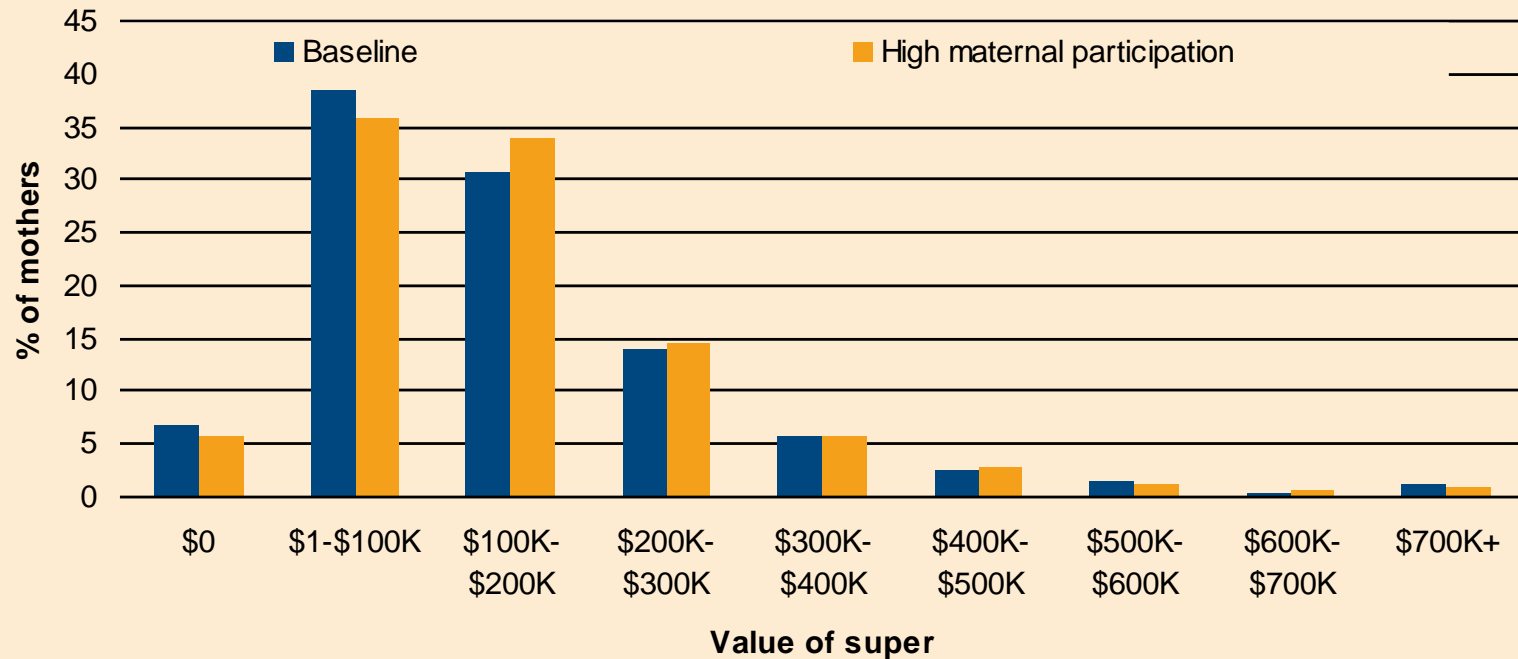


# Reducing disability among 45-64s by 3%

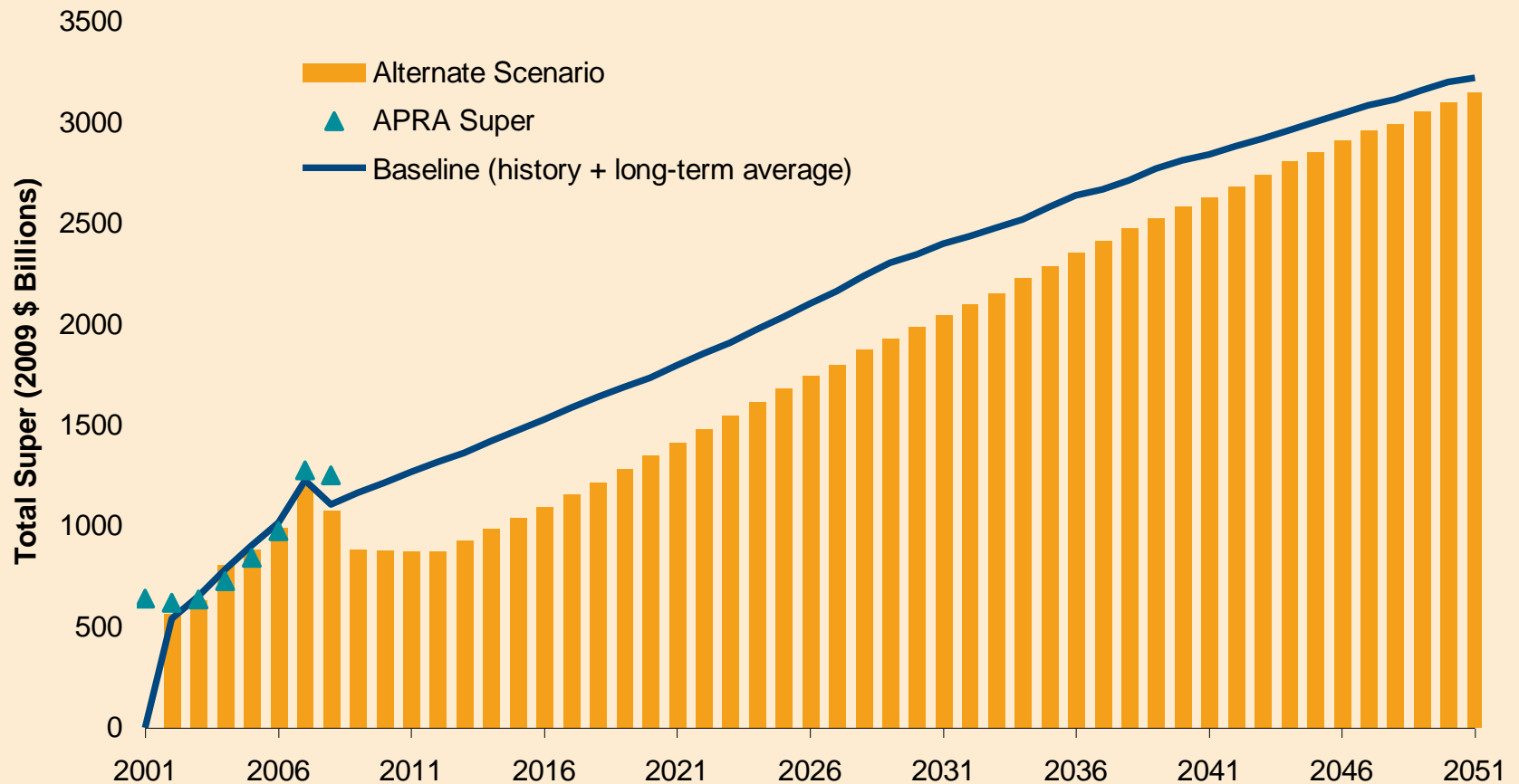


# Reduce impact of being a mother

## Women aged 55-64, 2043



# Impact on superannuation of the GFC



Experimental projection output only, APPSIM still under development, May 2009



# Compare scenarios – government view

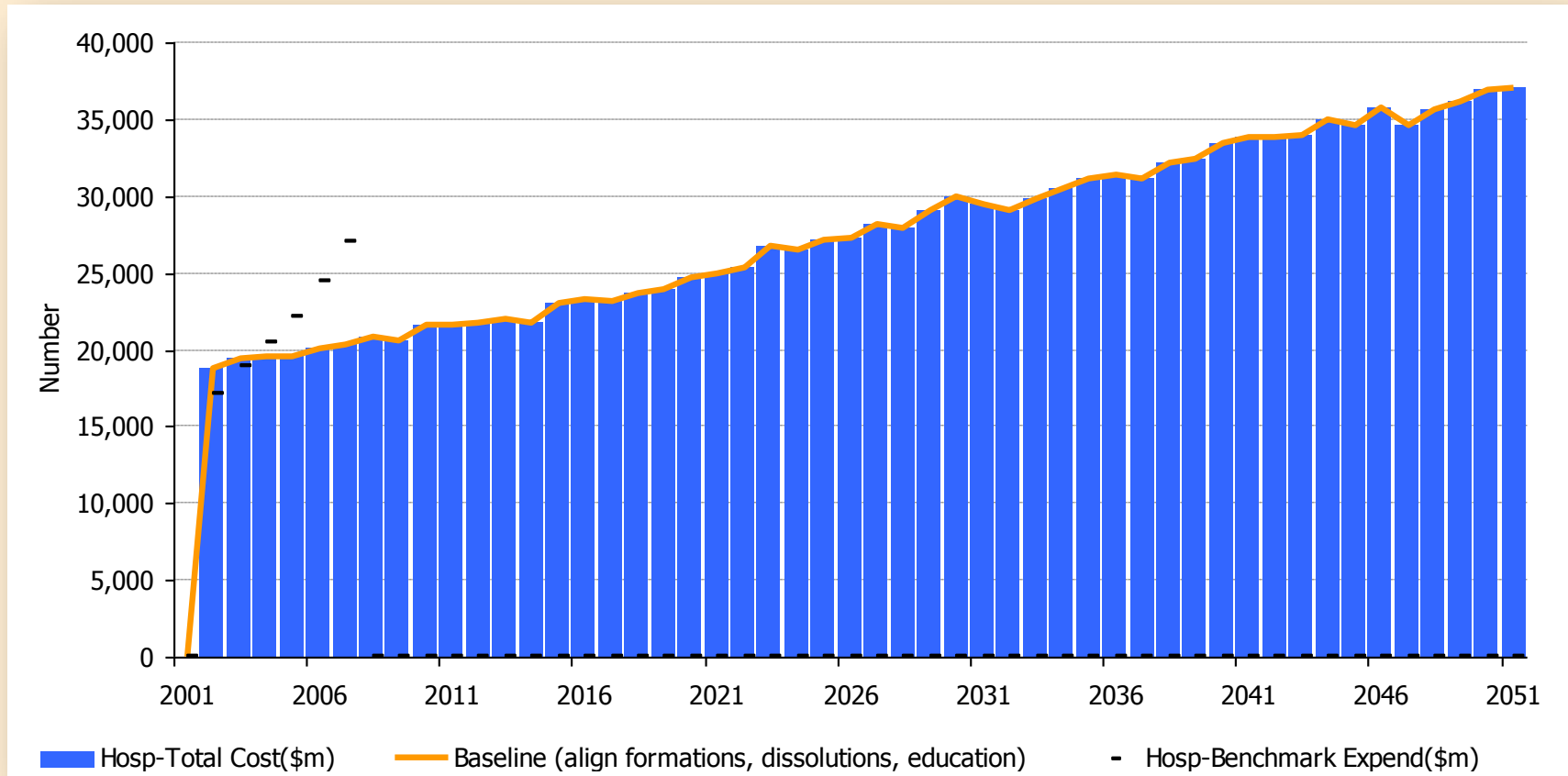
	2009	2019	2029	2039
Gov't AP Outlays – Baseline	100.0	134.3	166.6	187.5
Gov't AP Outlays – Financial Crisis	100.7	137.7	168.5	204.1
<i>Difference</i>	<b>0.7</b>	<b>3.5</b>	<b>1.9</b>	<b>16.6</b>
Total Super – Baseline	100.0	154.2	226.7	283.0
Total Super – Financial Crisis	75.8	117.2	187.1	269.6
<i>Difference</i>	<b>-24.2</b>	<b>-37.0</b>	<b>-39.5</b>	<b>-13.5</b>

# Compare scenarios - individual view

Age in 2009	Birth Cohort and Generation	2019
		%
25-34	Born 1975-1984 Generation X and Y	<b>-3.7</b>
35-44	Born 1965-1974 Generation X	<b>-20.1</b>
45-54	Born 1955-1964 Baby Boomers	<b>-25.9</b>
55-64	Born 1945-1954 Baby Boomers	-

# Experimental hospital results

Projected total government cost of hospital admissions in Australia, 2001-2051



Note: The graph shows initial output from the prototype health module where expenditure varies only due to demographic change, not to changing service usage within age/sex groups or growth in service cost due to such factors as technological change.

# In summary

- APPSIM is a dynamic microsimulation model
  - Provides aggregate and distributional projection outcomes
- Ideally suited to examining long term impact of government policy
- First version being provided to government partners in early 2010
- Some experimental output already available