サンプル

- 期間内はずっと交付・不交付のいずれかにあった団体
- 一部都道府県の市については1984年の保護率データなし．サンプル規模は435（1984-1986年）と424（1984-1987年）
- 1985年は国勢調査の年．利用可能な変数をコントロール変数として用いる．
- 処置変数をランダム化するために，各年のln(基準財政需要額/基準財政収入額)をコントロール変数に加える．

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推定結果

- 別紙ご参照

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Differences Estimation

- 2つのATE
- パラメトリックな推定
  - →条件無しの平均処置効果
- ノンパラメトリックな推定
  - →閾値付近での条件付き平均処置効果

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パラメトリック推定

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平均処置効果(Average treatment effect)の推定

- 教科書的なATE推定の延長 (Wooldrigde 2002)
- Conditional mean independenceをもたらす方法としてSRDDを利用。
  - 説明変数(生活保護率)の選択変数(需要収入比率)に関する条件付期待値(統制関数)をパラメトリックに特定化することによって、交付税の効果をunconditional ATEとして推定することが可能。
  - 統制関数の特定化を誤ると誤った推定を行うおそれ。

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平均処置効果(Average treatment effect)

- 処置効果 TE= $y_{1i}-y_{0i}$
  - y_{1i}: 政策介入があった場合(w_i=1)の保護率
  - y_{0i}: 政策介入がなかった場合(w_i=0)の保護率
- 平均処置効果

$$ATE=E(y_{1i}-y_{0i})=\mu_1-\mu_0$$

  - $\mu_1 \equiv E(y_{1i})$, $v_{1i} \equiv y_{1i}-E(y_{1i}) \Rightarrow y_{1i}=\mu_1+v_{1i}$
  - $\mu_0 \equiv E(y_{0i})$, $v_{0i} \equiv y_{0i}-E(y_{0i}) \Rightarrow y_{0i}=\mu_0+v_{0i}$

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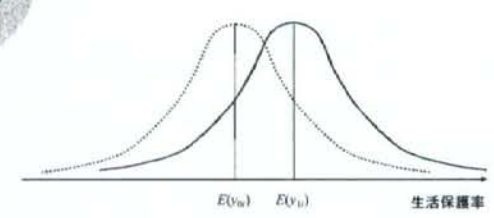
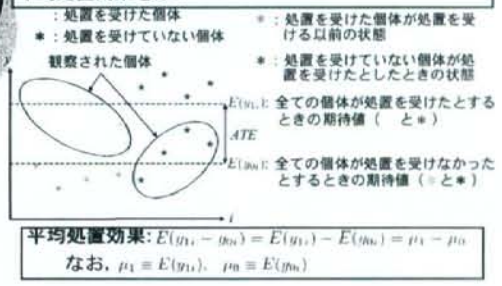
図3. モデルー平均措置効果(ATE)



27

モデルー平均措置効果(ATE)

平均処置効果とは？



平均処置効果: $E(y_{1i}-y_{0i})=E(y_{1i})-E(y_{0i})=\mu_1-\mu_0$

なお, $\mu_1 \equiv E(y_{1i})$, $\mu_0 \equiv E(y_{0i})$

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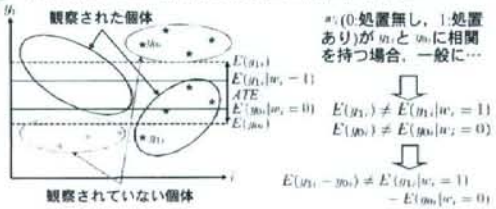
モデルーATEの推定上の問題

*ATE*を推定するにあたっての2つの問題点

問題点1：y_{1i}とy_{0i}を同時に観察することができない

問題点2：*ATE*の適切な推定量≠標本平均の差



w_i(0:処置無し，1:処置あり)がy_{1i}とy_{0i}に相関を持つ場合，一般に…

$E(y_{1i}) \neq E(y_{1i}|w_i=1)$
$E(y_{0i}) \neq E(y_{0i}|w_i=0)$

$E(y_{1i}-y_{0i}) \neq E(y_{1i}|w_i=1) - E(y_{0i}|w_i=0)$

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モデルー条件付期待値の独立性(1)

- 平均処置効果$E(y_{1i}-y_{0i}) = E(y_{1i}) - E(y_{0i}) = \mu_1 - \mu_0$の推定。
- 観察されるデータは

$$y_i = w_i y_{1i} + (1-w_i)\, y_{0i}$$

と表現することが可能である。これは $\delta = \mu_1 - \mu_0$ 、$v_{0i} \equiv y_{0i} - \mu_0$ および、$v_{1i} \equiv y_{1i} - \mu_1$ とすると、

$$y_i = \mu_0 + w_i \cdot \delta + \epsilon_i \qquad \epsilon_i \equiv v_{0i} + w_i \cdot (v_{1i} - v_{0i})$$

となる。

- 一般的にvとwは独立とは考えられないから

$$E(\epsilon_i | w_i) = E(v_{0i}|w_i) - w_i \cdot E(v_{1i}|w_i) - E(v_{0i}|v_i)] = 0$$

ならず、OLSでダミーの係数を推定することは不適切。

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モデルー条件付期待値の独立性(1)

(v_{1i}, v_{0i})の w_iと x_iに関する条件付き期待値を考える。

y_iの条件付期待値は $E(y_i|w_i, x_i) = \mu_0 + w_i \cdot \delta + E(\epsilon_i|w_i, x_i)$
と表現できる。ここで、

$$E(\epsilon_i|w_i, x_i) = E(v_{0i}|w_i, x_i) + w_i \cdot [E(v_{1i}|w_i, x_i) - E(v_{0i}|w_i, x_i)]$$

と表現されることに注意。

w_iが x_iの要素によって説明されると、

$w_i = g(x_i)$ と書けるので、
$E(v_{ji}|w_i, x_i) = E(v_{ji}|g(x_i), x_i) = E(v_{ji}|x_i),\ j = 0, 1$ となる

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$E(v_i|w_i, x_i) = E(v_i|x_i) = 0$

モデルー条件付期待値の独立性(2)

更に、

$$\epsilon_i = v_{0i} + w_i \cdot (v_{1i} - v_{0i}) - E(v_{0i}|x_i) + w_i \cdot [E(v_{1i}|x_i) - E(v_{0i}|x_i)] + u_i$$

とすると、

$$u_i \equiv v_{0i} + w_i \cdot (v_{1i} - v_{0i}) - E(v_{0i}|x_i) - w_i \cdot [E(v_{1i}|x_i) - E(v_{0i}|x_i)]$$

であるから、 $E(u_i|w_i, x_i) = E(u_i|x_i) = 0$ となる。

つまり、

$$y_i = \mu_0 + w_i \cdot \delta + E(v_{0i}|x_i) + w_i \cdot [E(v_{1i}|x_i) - E(v_{0i}|x_i)] + u_i$$

からの δの最小自乗推定量は*ATE*の適切な推定量となる

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鋭角型回帰非連続設計(SRDD: sharp regression discontinuity design)

- ここで処置変数を完全に説明できる別の変数xを考える。

$$w_i=w(x_i)=1\{x_i>c\},\ c=0$$

  - w_i: 交付団体か否かを表すダミー変数
  - x_i: ln(基準財政需要額/基準財政収入額)

→ 鋭角型回帰非連続設計(SRDD design: sharp regression discontinuity design)となる

33

統制関数(control function)

実際に推定する場合，条件付期待値 $E(v_{ji}|x_i)$を特定化する必要がある

$E(v_{ji}|x_i)=\theta_j+x_i\cdot\omega_j$ と特定化 (Wooldrige 2001)

推定すべき式は

$$y_i=\alpha+w_i\cdot\delta+x_i\cdot\gamma+w_i\cdot\Delta x_i\cdot\eta+\varepsilon_i$$

ただし，

$$\alpha\equiv\mu_0+\theta_0$$
$$\gamma\equiv\omega_1$$
$$\eta\equiv\omega_1-\omega_0$$
$$\Delta x_i\equiv x_i-E(x_i)$$

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- $E(v_{ji}/x_i)$ – 統制関数(control function)–の特定

$$E(v_{ji}/x_i)\equiv g_j(x_i)=\theta_j+\sum_p{}^P\eta_{jp}\cdot x_i^p$$
$$\Downarrow$$
$$E(v_{ji}/x_i)=\gamma+\delta w_i+\sum_p{}^P\{\eta_{0h}\cdot x_i^p+w_i\cdot\psi_h\cdot[x_i^p-E(x_i^p)]\}$$

$\gamma\equiv\mu_0+\theta_0$, $\psi_p\equiv\eta_{1p}-\eta_{0p}$

$E(x_i^p)$←サンプル平均

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推定モデル

- 統制変数には分散を小さくするため、コントロール変数(z_{ki})を加える。
- 推定式

$$y_i=\gamma+\alpha\cdot w_i+\sum_p{}^P\eta_{0p}\cdot x_i^p+\sum_k{}^K\pi_k\cdot z_{ki}+w_i\cdot\sum_p{}^P\psi_p\cdot(x_i^p-\sum_i x_i^p/n)+w_i\cdot\sum_k{}^K\zeta_k\cdot(z_{ki}-\sum_i z_{ki}/n)+u_i$$

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ノンパラメトリック推定

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閾値付近の条件付き平均処置効果の推定

- パラメトリックな推定方法(Thistlethwaite and Campbell 1960, Trochim 1984 and 2006)
- ノンパラメトリックな推定方法 (Imbens and Lemieux 2007) →ここで用いる方法
  - Local Linear Regression (Fan and Gijbels 1996)の応用
  - 帯域幅(bandwidth)の推定が必要
  - 推定されるのは閾値近傍付近の条件付平均処置効果(条件無しの平均処置効果ではない)

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推定対象

- 閾値$x_i=c=0$近傍での条件付平均処置効果

$$E(y_{1i}-y_{0i} \mid x_i=c) =$$
$$\lim_{x \downarrow c} E(y_i \mid x_i=x) - \lim_{x \uparrow c} E(y_i \mid x_i=x)$$

- したがって、閾値でのdiscontinuity (jump)が前提

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鋭角型の回帰非連続設計: sharp regression discontinuity (SRDD) design

- 閾値(ここでは、基準財政需要額/基準財政収入額=1、もしくは、ln(基準財政需要額/基準財政収入額)=0)を挟んだ、適合推定量(matching estimator)の一種。
- 閾値の近傍では、同様の特徴をもつ観測単位が、たまたま、処置(交付税)を受けたり、受けなかったりしている。したがって、当該閾値の近傍では似通った特徴を有する観測単位にランダムに処置が与えられることになる。

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図5. SRDD: 図説

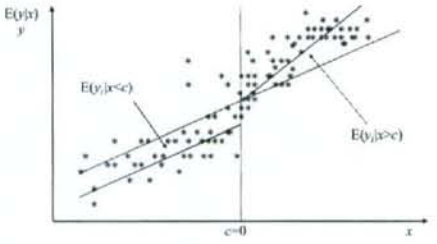

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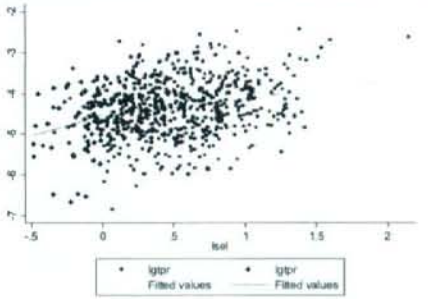
図4. 生活保護率と需要収入比率(2005年全市)



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Local Linear Regression のSRDDへの応用(Imbens and Lemieux 2007)

- 手順
  - 帯域幅(bandwidth)を交差検定(cross validation)により特定化
  - 特定化された帯域幅内の観測値を標本として、既述のパラメトリック推定で用いたモデルのうち、線形モデルをOLS推定(+HCCME)。
  - 閾値から離れた観測値の効果を受けない

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推定: local linear regression

- モデル(c=0)

(1) $y_i = \alpha + \beta(x_i - c) - \delta w_i + w_i\gamma(x_i - c) + \sum_k \phi_k z_{ki} + u_i$

(Imbens and Lemieux 2007)

カーネルはrectangular(帯域幅に落ちたデータには重み1、他のデータは重み0)

- 推定量はOLS+HCCME

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CV: 交差検定(Cross Validation)

① 観測単位にxの値にしたがって順位をつける(順位は添え字iで表す)。

② 順位づけられた標本をxの閾値=0を挟んで2つにわけ、それぞれの中央値をもってCVで考察する標本の上限と下限とする。

③ 任意の帯域幅hを所与として観測単位jに関し、$x_j<x_i<x_j+h$(もしくは$x_j-h<x_i<x_j$)となる観測単位をサンプルとして通常の最小自乗法を行い、その切片の推定値を$\alpha_j(x_j)$(もしくは$\alpha_j(x_j)$)とする。

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CV: 交差検定(Cross Validation)

④ $\mu(x_j)=\alpha_j(x_j)$ if $x_j>0$、$\mu(x_j)=\alpha_j(x_j)$ if $x_j<0$と定義し、次の値を最小化するhを求める。

$$CV(h) = N^{-1}\sum[y_i-\mu(x_i)]^2$$

⑤ CVで考察する標本規模を絞ることによって選択される帯域幅hの感度を確認する。

- CV50: c=0を挟んだ50%標本のCV(h)
- CV25: c=0を挟んだ25%標本のCV(h)
- CV10: c=0を挟んだ10%標本のCV(h)

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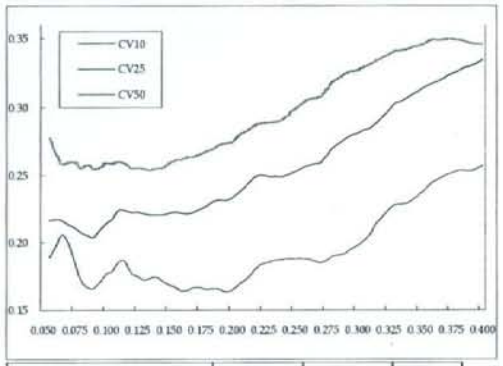

	CV_{50}	CV_{25}	CV_{10}
最小のCVをもたらす帯域幅	0.135	0.090	0.195

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推定結果

○ 別紙ご参照

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NATSEM
UNIVERSITY OF CANBERRA

Who Wins, Who Loses and By How Much? Predicting the Current, Future and Spatial Impact of Policy Change Using Microsimulation Models

Presentation to 'National Institute of Population and Social Security Research' Seminar Series, Tokyo

Professor Ann Harding

27 January 2009

Australian cash transfer system

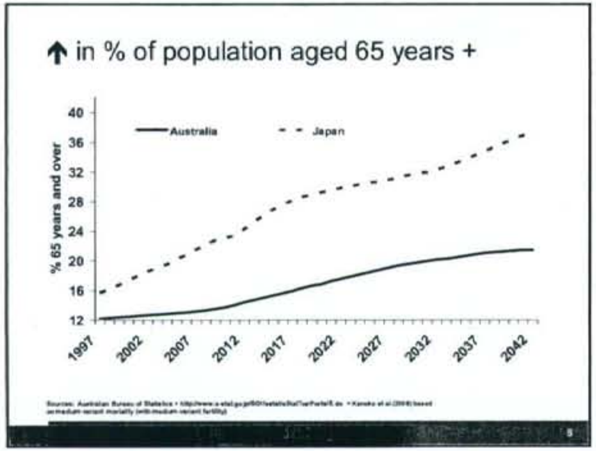
- Almost all payments are income and asset tested (targeted to those in most need)
  - Age pensions, disability, parenting payment single (child < 8)
  - 'Allowances' have much harsher income tests & and may be activity tested - Newstart (unemployed), Youth Allowance
- Relatively high cash payments to families with children
- Benefits are **flat-rate**, paid from general revenue
  - Quite different to the social insurance (earnings-related) systems of Europe
- Numerous other minor payments (Rent assistance etc)
  - Plus 'health' concession cards (passport to concessional pharmaceuticals)

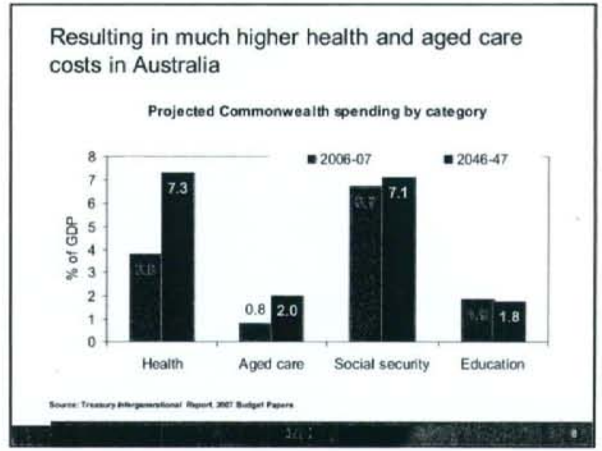
Income tax side

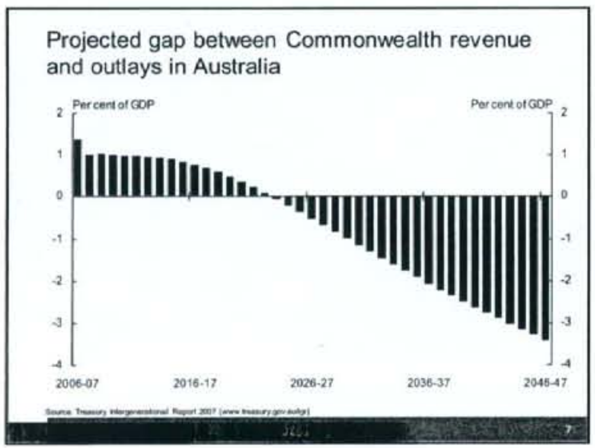
- 'Progressive' tax schedule means that marginal tax rates increase as income increases
  - Top marginal rate of 45c in $ above $180,000 + 1.5% Medicare levy
- Also a multitude of tax concessions for specific groups
  - Senior Australians Tax Offset
  - Low Income Tax Offset
  - Mature Australians Tax Offset
  - Pensioner Rebate/Beneficiary Rebate

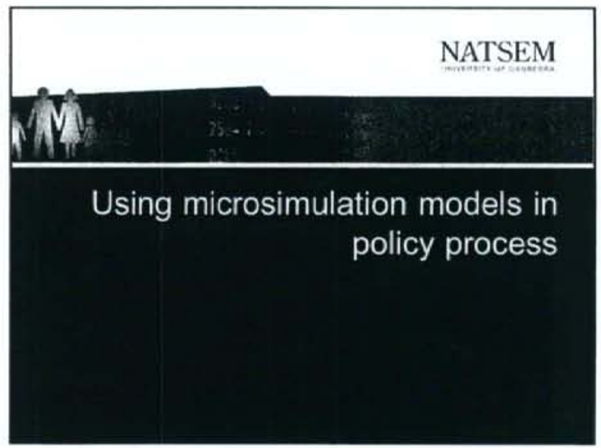
Challenges facing Australian welfare state

- Population ageing
- High effective marginal tax rates (work incentives)
- Currently major reviews underway
  - Harmer pension review (reports February 2009)
  - Henry tax review (reports December 2009)


↑ in % of population aged 65 years +
% 65 years and over
40
36
32
28
24
20
16
12
Australia
Japan
1997
2002
2007
2012
2017
2022
2027
2032
2037
2042


Resulting in much higher health and aged care costs in Australia
Projected Commonwealth spending by category
% of GDP
8
7
6
5
4
3
2
1
0
2006-07
2046-47
7.3
0.8
2.0
7.1
1.8
Health
Aged care
Social security
Education
Source: Treasury Intergenerational Report 2007 Budget Papers


Projected gap between Commonwealth revenue and outlays in Australia
Per cent of GDP
Per cent of GDP
2
1
0
-1
-2
-3
-4
2006-07
2016-17
2026-27
2036-37
2046-47
7


NATSEM
Using microsimulation models in policy process

2

What are microsimulation models?

- **Based on microdata sets**
  - Records of individual people or households
  - Usually large – thousands of records
    - Sample surveys (Australian Bureau of Statistics), or
    - Administrative data
- **Allow detailed assessment of impact of change**
  - On individuals
  - On groups of individuals
  - On whole population
  - On government budgets

NATSEM

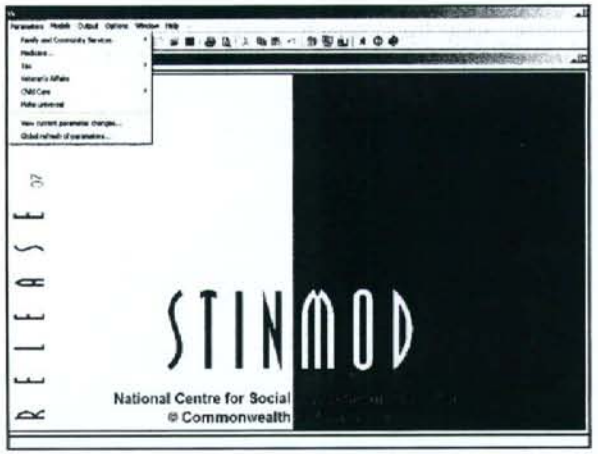
Static tax-transfer models

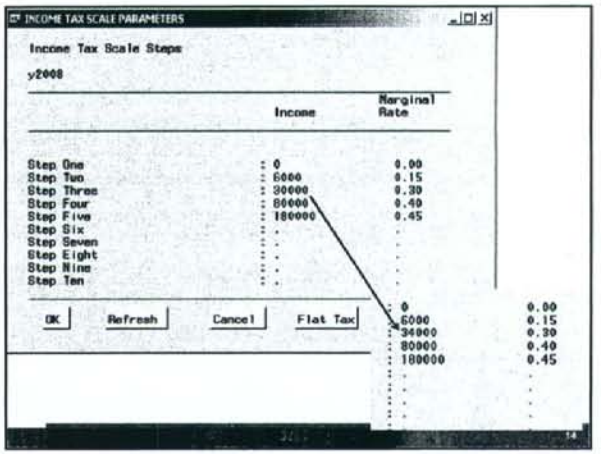
Static models widely used across developed world

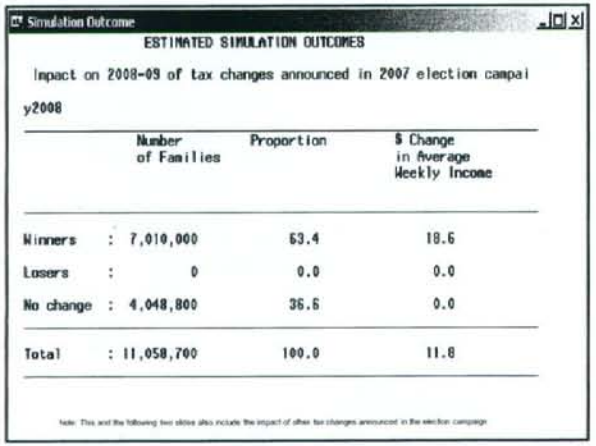
- **Static tax-transfer models show *morning after* impact of a policy change**
- **EUROMOD for EU15 (and soon 25)**
- **TRIM model in US** (http://trim3.urban.org/)
- **SPSD/M for Canada**
- **LOTTE for Norway**
- **GLADHISPANIA for Spain**
  - See Gupta and Harding (2007) for summaries of 22 microsimulation models in use across the world

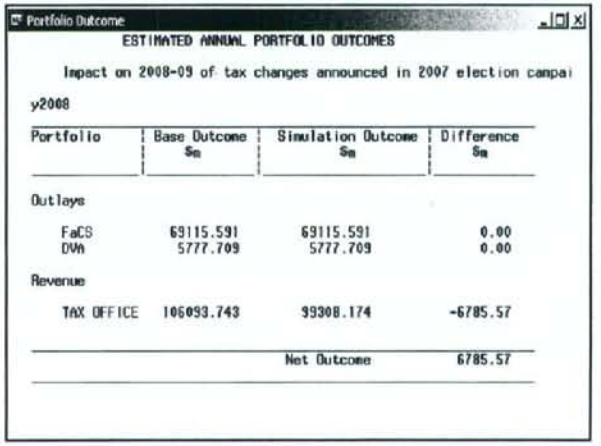
STINMOD – Australian model

- **Static microsimulation model replicating rules of the Australian tax, social security, & family payments systems**
- **'Day after' impact, no behavioural change**
- **Developed by NATSEM, first release STINMOD 94, latest is STINMOD 08**
- **Shows impact of possible policy changes**
  - Fiscal (revenue and expenditure)
  - Distributional (winners and losers)
  - Effective marginal tax rates (EMTRs)


RELEASE 37
STINMOD
National Centre for Social
© Commonwealth


INCOME TAX SCALE PARAMETERS
Income Tax Scale Steps
y2008
Income
Marginal Rate
Step One : 0 0.00
Step Two : 6000 0.15
Step Three : 30000 0.30
Step Four : 80000 0.40
Step Five : 180000 0.45
Step Six :
Step Seven :
Step Eight :
Step Nine :
Step Ten :
OK
Refresh
Cancel
Flat Tax
: 0 0.00
: 6000 0.15
: 34000 0.30
: 80000 0.40
: 180000 0.45


Simulation Outcome
ESTIMATED SIMULATION OUTCOMES
Impact on 2008-09 of tax changes announced in 2007 election campai
y2008
Number of Families
Proportion
$ Change in Average Weekly Income
Winners : 7,010,000 63.4 18.6
Losers : 0 0.0 0.0
No change : 4,048,800 36.6 0.0
Total : 11,058,700 100.0 11.8


Portfolio Outcome
ESTIMATED ANNUAL PORTFOLIO OUTCOMES
Impact on 2008-09 of tax changes announced in 2007 election campai
y2008
Portfolio
Base Outcome $m
Simulation Outcome $m
Difference $m
Outlays
FaCS 69115.591 69115.591 0.00
DVA 5777.709 5777.709 0.00
Revenue
TAX OFFICE 106093.743 99308.174 -6785.57
Net Outcome 6785.57

Outcome by Family Type and Income

Estimated Change in Family Disposable Income - $ pw

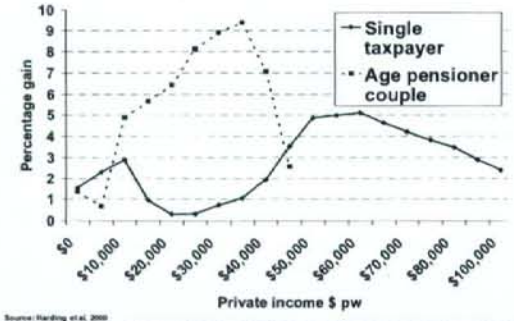
Impact on 2008-09 of tax changes announced in 2007 election campai
Outcome: ALL Population: All Recipients
y2008

Weekly Taxable Income	Family Type: Married no childr.	Married + children	Sole Parent	Single Adult	ALL
< 150	0.20	0.58	0.00	0.00	0.05
150-299	0.26	0.33	0.08	0.71	0.56
300-449	0.45	2.09	1.62	5.62	3.32
450-599	1.47	7.03	6.39	8.68	5.59
600-749	10.78	15.96	16.99	19.06	17.23
750-899	17.43	19.09	19.57	20.30	19.60
900-1049	20.27	19.58	19.33	18.63	19.17
1050-1199	21.33	18.82	15.86	12.77	16.69
1200-1349	23.78	20.35	13.47	11.54	17.84
1350-1499	26.20	21.61	13.69	11.54	19.45
1500+	26.45	24.85	15.42	11.54	23.65
TOTAL	13.15	21.07	7.32	7.96	11.80

The Great Australian tax reform debate, 1998-2000

- Introduction of 10% goods & services tax (like VAT)
- Removal of existing inefficient indirect taxes (wholesale sales tax)
- Major cuts in income tax
- Large increases in social security to compensate poor
- Question: how to ensure tax reform package is fair?
- Answer: assess its distributional impact using microsimulation models -> use NATSEM
- Compensation to poor increased after NATSEM analysis

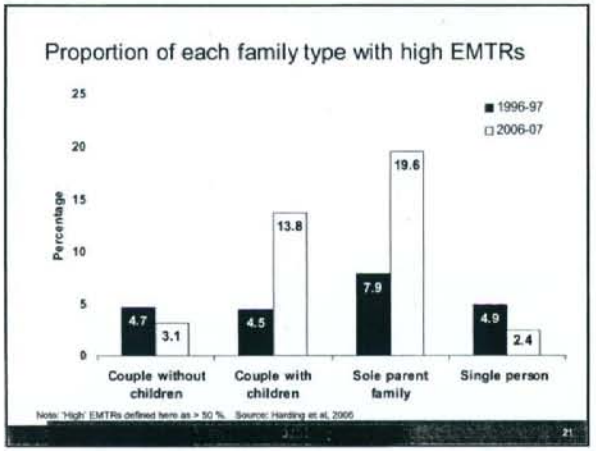
% gain in disposable income in July 2000 tax reform package

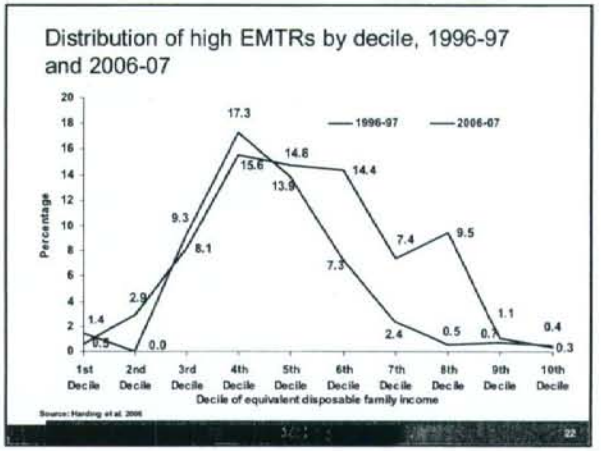


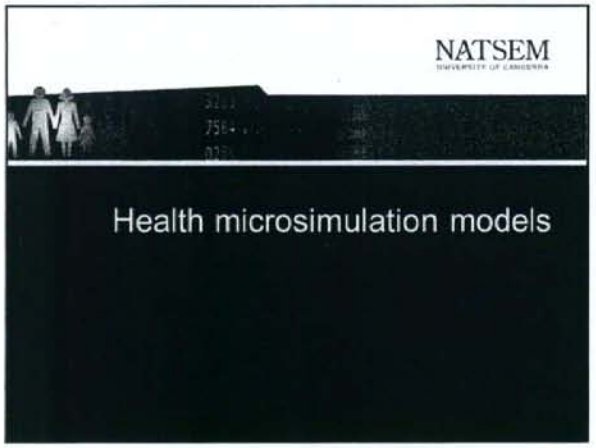
Source: Harding et al, 2000

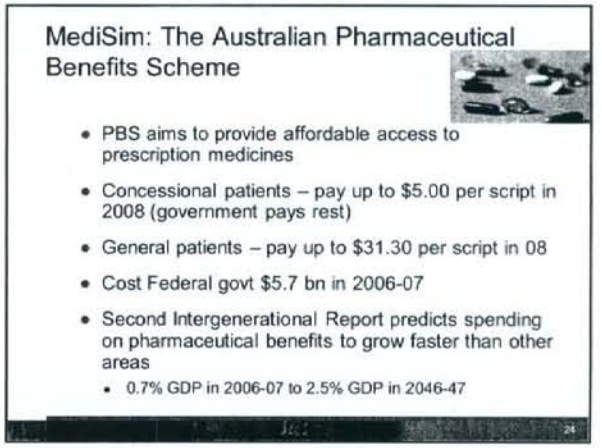
Trends in effective marginal tax rates (EMTRs)

- With ageing population and labour shortages, EMTRs are a major policy issue
- Australia wants to reduce work disincentives – issue being considered in current Treasury Tax Review
- EMTRs measure the proportion of an additional dollar of earnings that is lost to both income tax and the reduction of income-tested government benefits (e.g. Newstart, Aged Pension, Family Tax Benefit (FTB)
- Australian system highly means-tested:
  - In 2006-07, 7.1 % of working-age Australians (910,000 people) faced EMTRs of 50c in the dollar or more.
  - Up from 4.8% in 1996-97

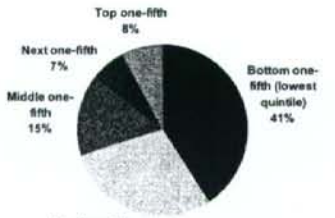

Proportion of each family type with high EMTRs
1996-97
2006-07
Percentage
25
20
15
10
5
0
4.7
3.1
4.5
13.8
7.9
19.6
4.9
2.4
Couple without children
Couple with children
Sole parent family
Single person
Note: 'High' EMTRs defined here as > 50 %. Source: Harding et al, 2006
21


Distribution of high EMTRs by decile, 1996-97 and 2006-07
1996-97
2006-07
Percentage
20
18
16
14
12
10
8
6
4
2
0
1.4
0.5
2.9
0.0
9.3
15.6
8.1
17.3
13.9
14.8
7.3
14.4
2.4
7.4
0.5
9.5
0.7
1.1
0.4
0.3
1st Decile
2nd Decile
3rd Decile
4th Decile
5th Decile
6th Decile
7th Decile
8th Decile
9th Decile
10th Decile
Decile of equivalent disposable family income
Source: Harding et al, 2006
22


NATSEM
Health microsimulation models


MediSim: The Australian Pharmaceutical Benefits Scheme
PBS aims to provide affordable access to prescription medicines
Concessional patients – pay up to $5.00 per script in 2008 (government pays rest)
General patients – pay up to $31.30 per script in 08
Cost Federal govt $5.7 bn in 2006-07
Second Intergenerational Report predicts spending on pharmaceutical benefits to grow faster than other areas
0.7% GDP in 2006-07 to 2.5% GDP in 2046-47
24

% of total PBS outlays received by each income quintile



Ranked by equivalent disposable income of their family using new OECD scales

Source: Harding et al. 2004

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Other health models

- HealthMod – cost and use of doctors (Medicare)
- HospMod – cost and use of public and private hospitals
- Diabetes model – long-term costs and benefits of diabetes prevention and management strategies
- DYNOPTA – optimising ageing and compressing morbidity – dynamic model of 45+ yr olds
- Dementia modelling
- NHMRC Economics and Financing of Health project
  - With Monash Uni
  - Linking MONASH macro model to NATSEM's micro models

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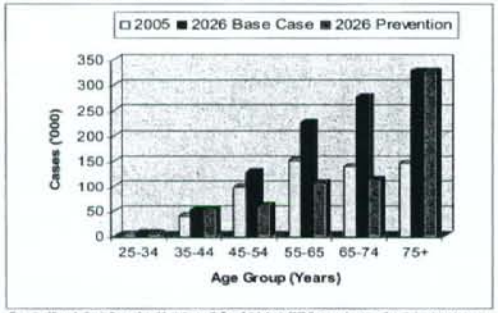
Estimated Reduction in Diabetes from a Secondary Prevention Program (Males)



Example of the reduction in the number of Australians with Type 2 diabetes in 2026 if a secondary prevention strategy is run (e.g. an intensive lifestyle intervention that promotes improved exercise and diet etc). This is output from the Diabetes Model.

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NATSEM

Dynamic models: simulating the future

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

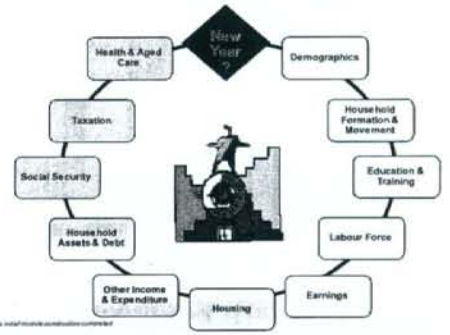
The Australian Population and Policy Simulation Model (APPSIM)

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

APPSIM

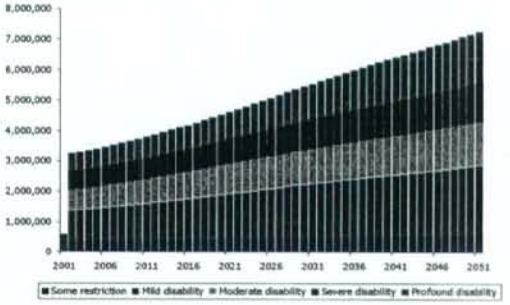
- APPSIM aims to provide snapshot output of the characteristics of the population and government programs as at 30 June each year.
- Base data is 2001 Census one per cent sample file (188,000 people), stored in Microsoft Access database
- Parameters stored in Excel spreadsheets and language is C#
- Full population model, with individuals being aged to about 2050; discrete yearly time unit
- HILDA panel data being used to estimate transition probabilities – 5 years of data, 7000 households, sample size problems
- Alignment required to match ABS population projections and Treasury Intergenerational Report labour force projections

Processes to be modelled within APPSIM



Parameter Screen

APPSIM Sample Output – Disability Status



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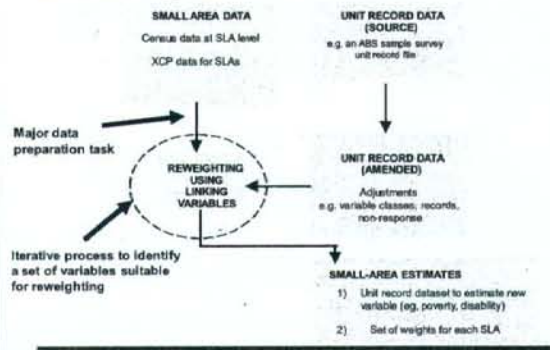
Spatial microsimulation models

Spatial Microdata and Microsimulation

- **Combine the information-rich ABS survey data with the geographically disaggregated Census data**
- **Using 'spatial microsimulation' to create detailed unit record data for small areas (synthetic spatial microdata)**

Constructing small-area estimates



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Reweighting

Unit record	Household ID	Age	Disability Level	Other variables	Person weight
1	1	65	profound		1820
2	2	76	severe		157
3	2	75	none		157
4	2	65	mild		157
5	3	60	none		1903
6	3	65	none		1903
7	4	70	none		70
8	4	85	moderate		70
9	6	80	mild		763
10	6	65	severe		763
63226	18374				
					19,374,000
					Num of individuals in Aust

NSW SLA1	NSW SLA2	NSW SLA3	Other SLAs
0	0	0	
0	0	0	
0	0	0	
0	0	0	
2.45	13.54	16.38	
2.45	13.54	16.38	
0	0	0	
0	0	0	
3.27	0	0	
3.27	0	0	
12465	26853	37940	

Num of individuals in small areas

38

Application 1: Analysis of Specific Population Sub-Groups

- Allows – for small areas:
  - identification and analysis of specific socio-demographic groups and characteristics
  - analysis at various population levels: e.g. persons, income units, households
- Examples – children in low income families; children in jobless families; unskilled youth, those in housing stress

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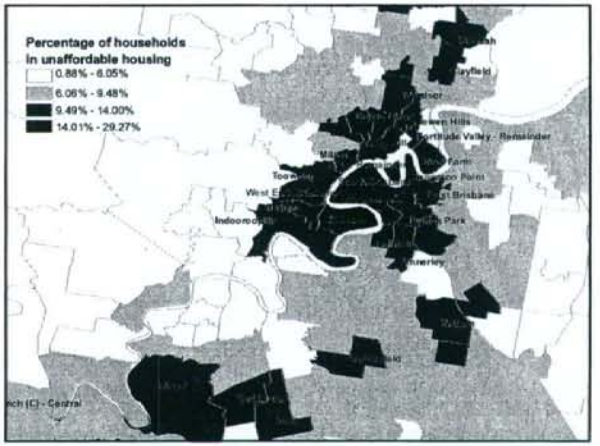


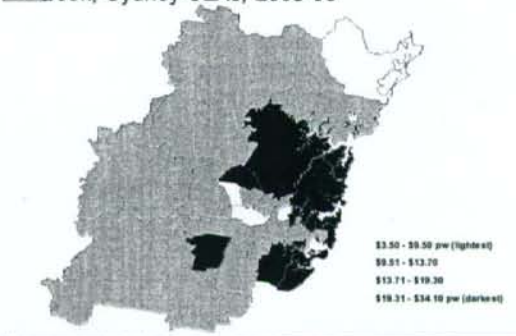
Application 2: Predict spatial impact of a policy change

- **Spatial microdata now linked with NATSEM's existing microsimulation models to model the immediate distributional/revenue impact of a policy change**
  - link synthetic spatial output to STINMOD and model changes to the tax and transfer system for small geographic areas
  - Currently modelling changes in Commonwealth Rent Assistance, income tax, social security and family payments
    - spatialMSM and HOUSEMOD models

Where did the $5bn of 2005-06 tax cuts go?

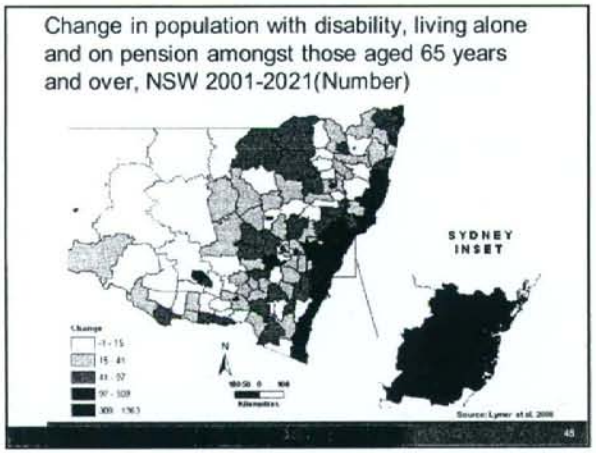
2004-05		2005-06	
Tax threshold	Tax rate	Tax threshold	Tax rate
$6,000	0.17	$6,000	0.15
$21,600	0.3	$21,600	0.3
$58,000	0.42	$63,000	0.42
$70,000	0.47	$95,000	0.47

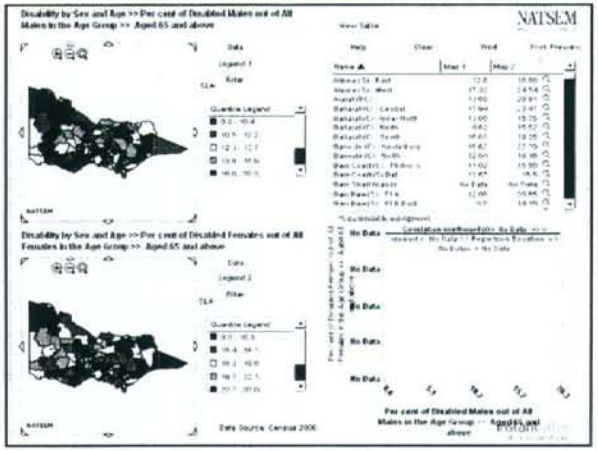
Estimated average tax cut per household per week, Sydney SLAs, 2005-06



Application 3: Develop needs-based planning indicators

- CAREMOD
  - 'Regionalised' Survey of Disability, Ageing and Carers
  - Simulating current and future characteristics of older Australians
  - At a detailed regional level (SLA)
  - Imputing functional status and thus likely need for different types of care
- Projecting current and future need for services at small area level
  - Given population ageing
- Research partners: NSW, Vic, Qld and ACT





Evidence based policy making

- Growing demand for quantitative decision support tools
- Not good enough today to do 'back of the envelope' estimates of impact of policy change
- Log on to **www.natsem.canberra.edu.au** and join our free email update list
  - 2nd General conference of International Microsimulation Association, Ottawa, June 2009 http://www.statcan.gc.ca/conferences/ima-aim2009/index-eng.htm
  - International Microsimulation Association (free to join) - http://www.microsimulation.org/

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