

Simulating the Effects of Tax Reforms on Government Expenditure, Labour Supply and Income Distribution: some examples

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Treasury Academic Linkages Seminar

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**THE UNIVERSITY OF
MELBOURNE**



MELBOURNE INSTITUTE
of Applied Economic and Social Research

Concluding remarks

- Two recent examples of a microsimulation analysis
- CEF is well targeted, aimed at creating no losers
- Simplicity of AFTS creates winners and losers
- Is cheaper to implement (so there is room for compensation)
- Highest incomes benefit most (in absolute dollars)
- Can be addressed (which will reduce costs and can be used to help lower income families)

Results: Work Incentives

- Labour Supply effects relative to July 2011

	AFTS	CEF
couple men	1,900	2,900
couple women	38,900	8,600
single men	300	2,100
single women	1,400	1,700
single parents	-4,700	8,200
Total	37,800	23,500

Results: AFTS

- Top rate should be 46.5% to cap gains (or leave in a health levy)
 - This is due to abolishing Medicare Levy
 - Impact even larger if ML surcharge is included
- Increases income inequality
- Rebates and offsets
 - CEF: keeps them and adjusts as necessary
 - AFTS: drops them and (partially) compensates by tax exempting Income Support and other transfers

Results: AFTS winners and losers

- Not everyone a winner: Distribution by decile

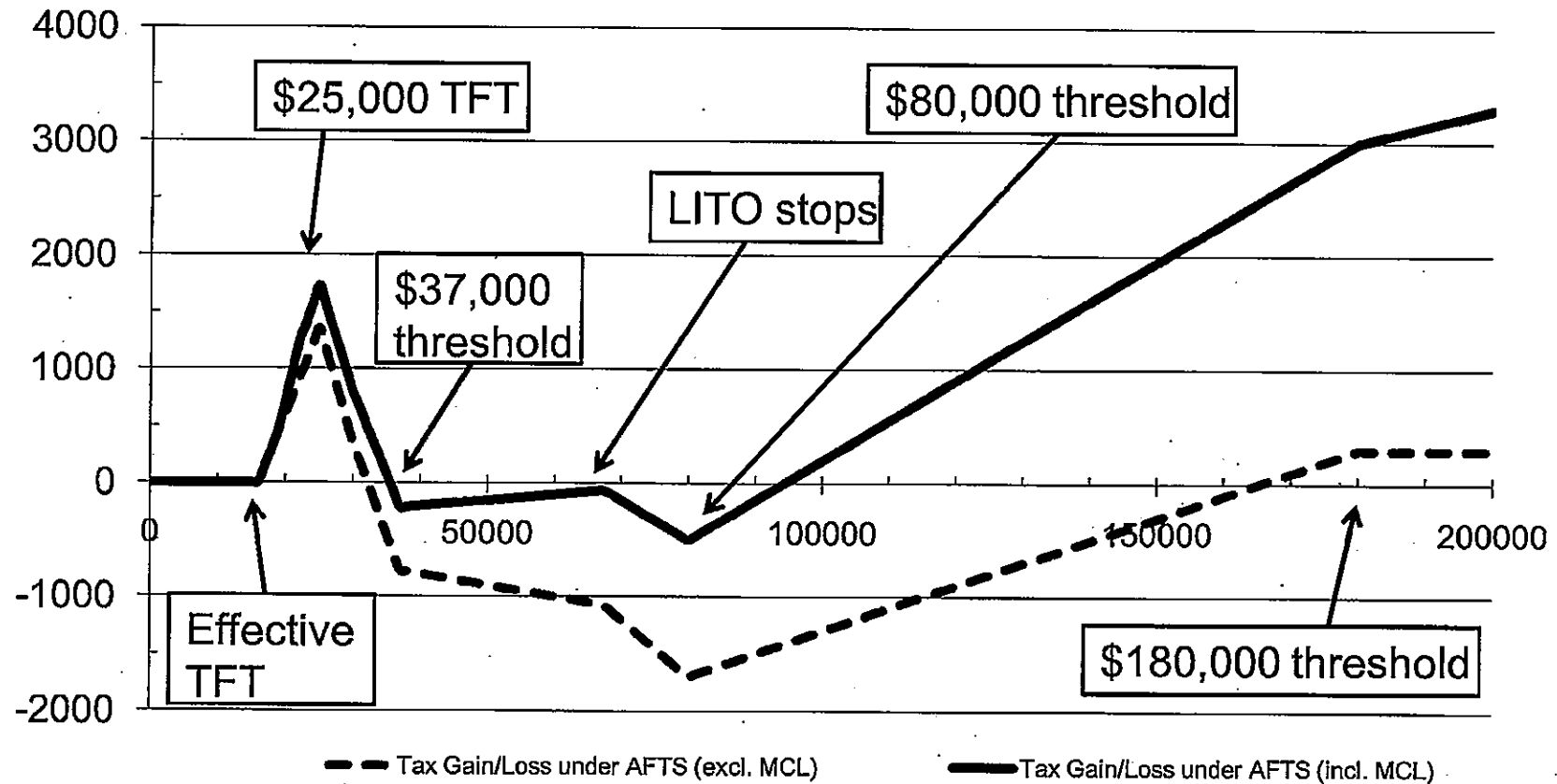
Decile	Net HH Income Loss in \$/week			Even	Net HH Income Gain in \$/week			Avg
	> \$10	\$5 - \$10	\$1 - \$5		\$1 - \$5	\$5 - \$10	> \$10	
1	-	-	-	88.8	4.3	1.4	5.4	1.16
2	0.1	0.2	-	63.9	2.3	9.5	24.1	6.37
3	5.2	0.7	17.9	51	5.1	8.6	11.6	1.14
4	18.4	2.2	37.4	13.8	2	9	17.3	-2.3
5	26.6	4.9	43.6	6.4	2	2.3	14.1	-6.29
6	14.1	22.6	31.5	5.7	4.6	4.2	17.5	-2.87
7	13.1	29.4	12.5	5.1	10.9	8.4	20.6	-0.71
8	12.2	29.4	18.5	2.3	5.2	5.9	26.5	1.06
9	20.6	24.3	15.4	4.4	6	3.3	26.1	3.25
10	7	5.5	5.2	3.1	3.6	6.4	69.2	41.24
Total	11.72	11.92	18.19	24.46	4.59	5.89	23.22	4.2

Results: Costs (excl. 1.7% Clean Energy Supplements)

	AFTS		CEF 2012-2013		CEF 2015-2016	
	In \$ million	Share (in %)	In \$ million	Share (in %)	In \$ million	Share (in %)
Cost (under fixed labour supply)						
Total	1,947	100	2,391	100	2,960	100
Couple	1,203	62	1,382	58	1,748	59
Single men	448	23	466	19	574	19
Single women	308	16	355	15	433	15
Single parents	-11	-0.0	188	8	206	7
Cost (under flexible labour supply)						
Total	2,075	100	2,447	100	3,036	100
Couple	1,218	59	1,525	62	1,915	63
Single men	468	23	467	19	572	19
Single women	349	17	376	15	458	15
Single parents	41	0.0	80	3	91	3

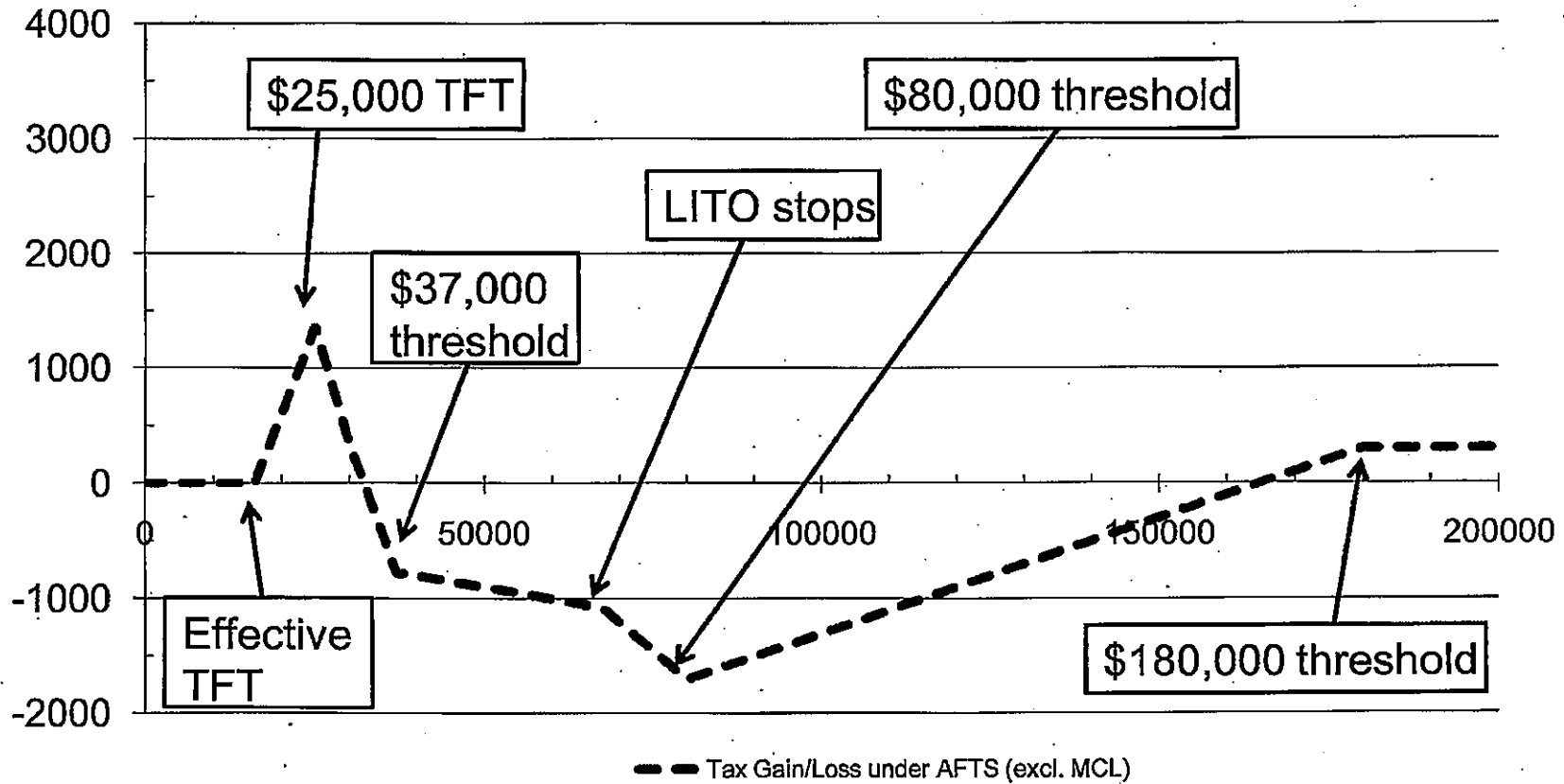
Results: AFTS

Tax Gains/Losses from AFTS Changes by Annual Gross Income (\$/yr)



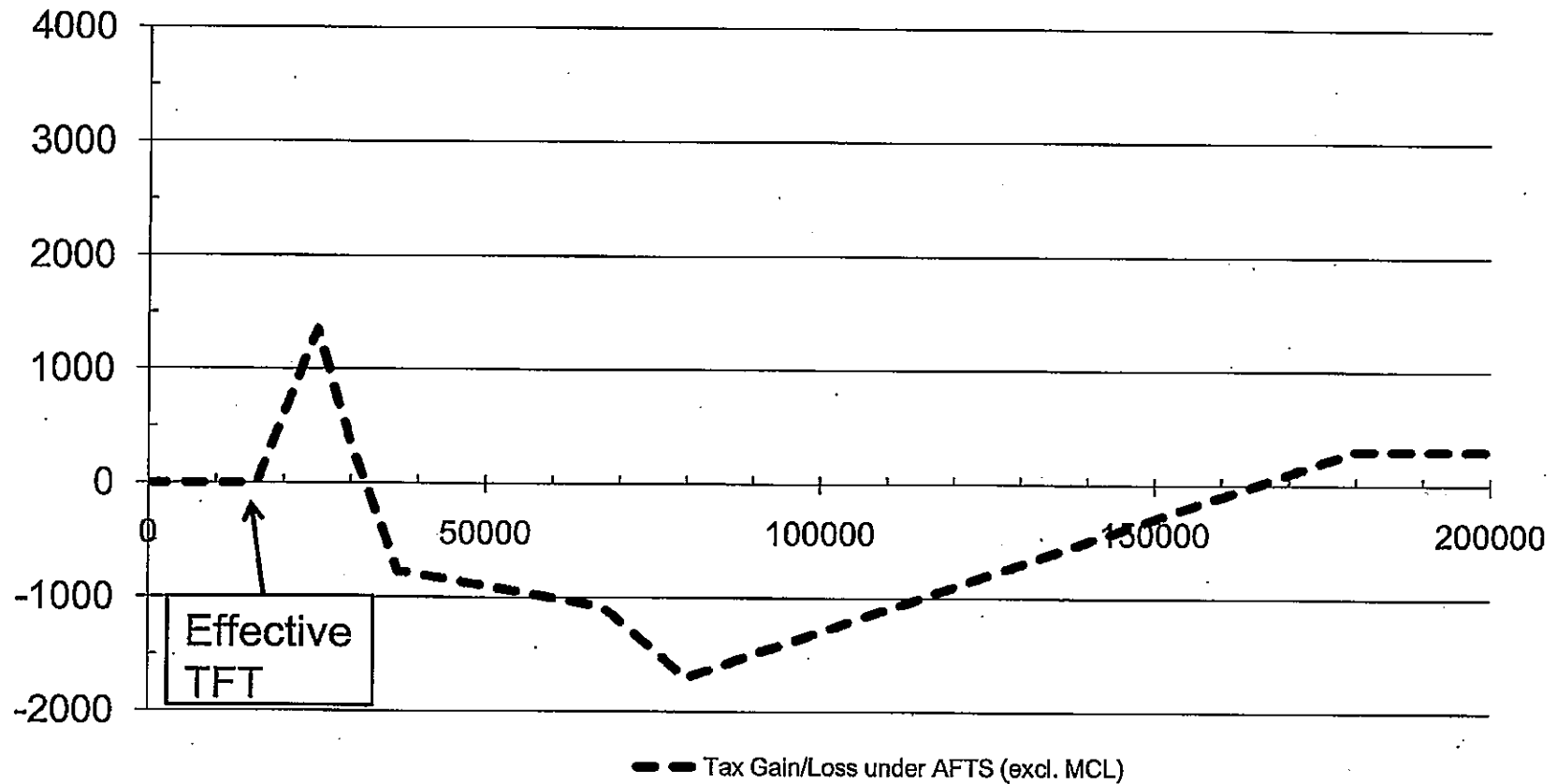
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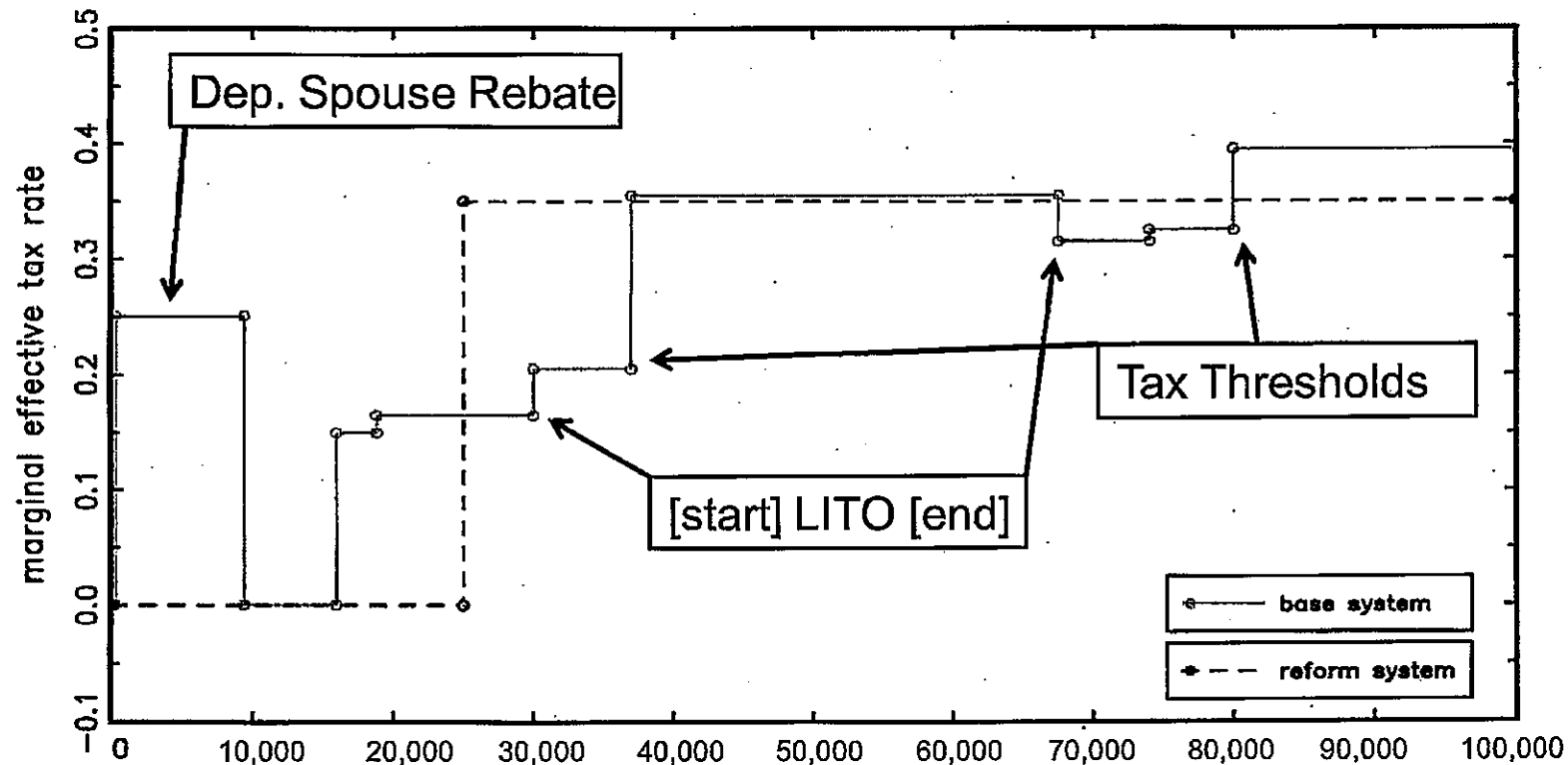
Tax Gains/Losses from AFTS Changes by Annual Gross Income (\$/yr)



Results: EMTRs under AFTS

- Couple, spouse on \$80,000 per year

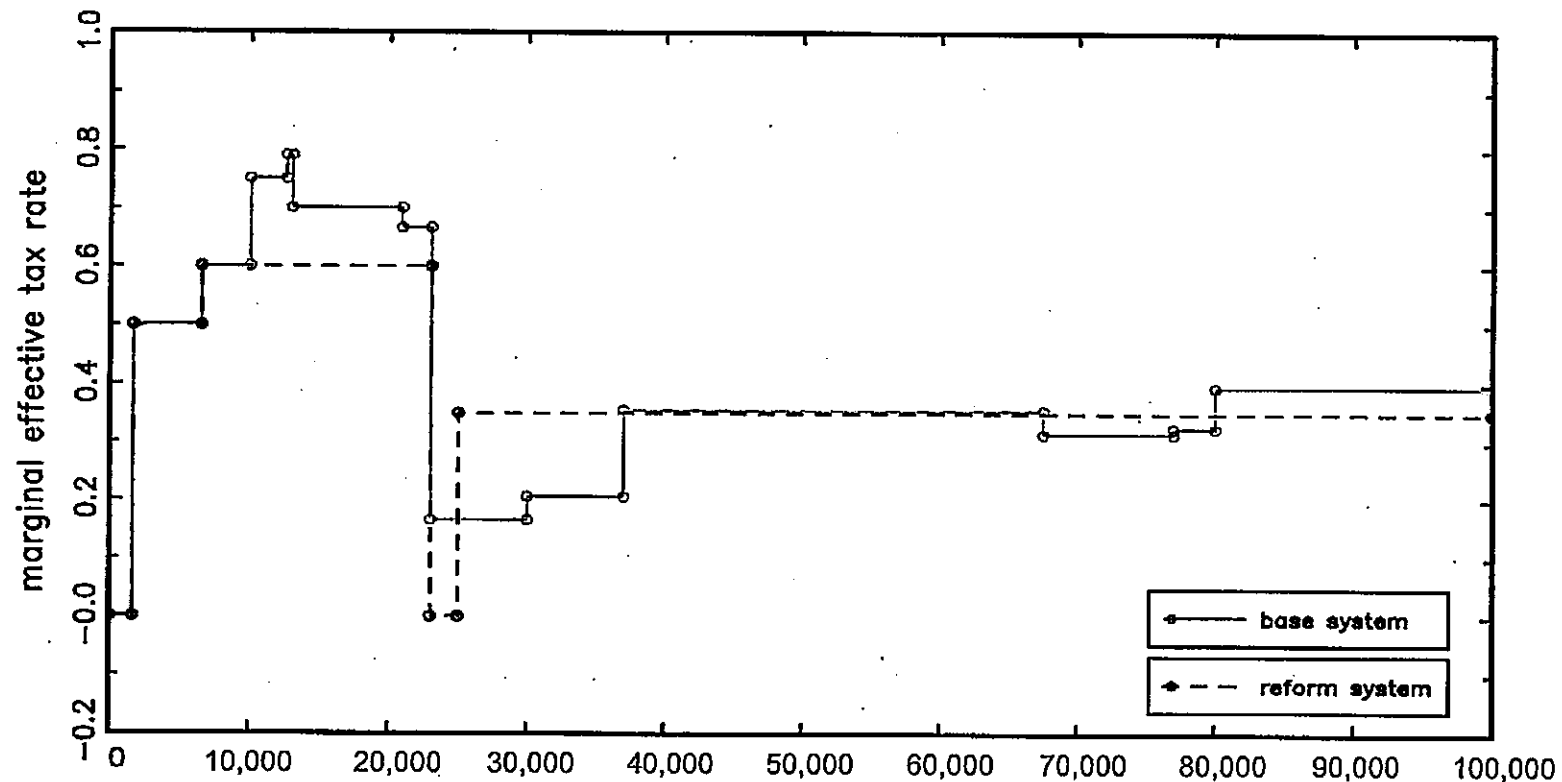
Marginal Effective Tax Rates: pre- and post-reform



Results: EMTRs under AFTS

■ Single

Marginal Effective Tax Rates: pre- and post-reform



Details of the changes: AFTS

	July 2011 (base)		CEF 2012-2013		CEF 2015-2016		AFTS changes	
	Threshold	Rate	Threshold	Rate	Threshold	Rate	Threshold	Rate
Tax schedule	6,000	0	18,200	0	19,400	0	25,000	0
	37,000	0.15	37,000	0.19	37,000	0.19	180,000	0.35
	80,000	0.30	80,000	0.325	80,000	0.33		
	180,000	0.37	180,000	0.37	180,000	0.37		
	>180,000	0.45	>180,000	0.45	>180,000	0.45	>180,000	0.45
Rebates	Yes		Yes		Yes		No	
Govt Transfers taxed	Yes		Yes		Yes		No	
Medicare Levy	Yes		Yes		Yes		No	
LITO	\$1500		\$445		\$300		No	
LITO taper & threshold	4% from \$30K		1.5% from \$37K		1% from \$37K		-	
Pensions & Allowances	Current		+1.7% Tax free supplement		+1.7% Tax free supplement		Current	

Australian Future Tax System

- **Simulated recommendations:**

- **Recommendation 2:**

Progressivity in the tax and transfer system should be delivered through the personal income tax rates scale and transfer payments. A high tax-free threshold with a constant marginal rate for most people should be introduced to provide greater transparency and simplicity.

- **Recommendation 4:**

Income support and supplementary payments should be tax-exempt.

- **Recommendation 5:**

The Medicare levy and structural tax offsets — the low income, senior Australians, pensioner and beneficiary tax offsets — should be removed as separate components of the system and incorporated into the personal income tax rates scale. If a health levy is to be retained, it could be applied as a proportion of the net tax payable by an individual.

Results: Work Incentives

- Labour Supply effects relative to July 2011

	CEF
couple men	2,900
couple women	8,600
single men	2,100
single women	1,700
single parents	8,200
Total	23,500

Results: Costs (excl. 1.7% Clean Energy Supplements)

	CEF 2012-2013		CEF 2015-2016	
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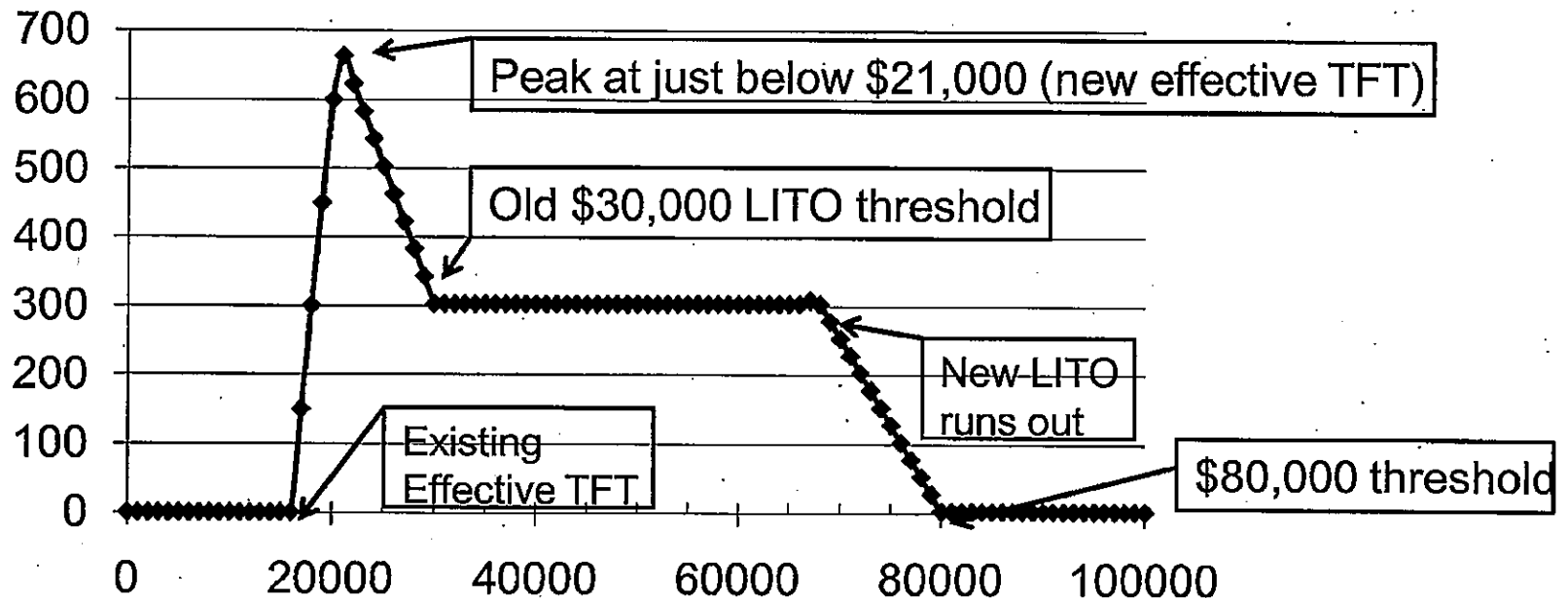
Results: Clean Energy Future 2012-13

- Simple graph ignores reality
- Tax-free threshold interacts with rebates
- Series of rebate parameters need to be recalibrated to ensure no losers
 - SATO
 - Pensioner Rebate
 - Dependent Spouse Rebate
- Increases cost of the policy

Results: Clean Energy Future 2012-2013

- Every taxpayer a winner

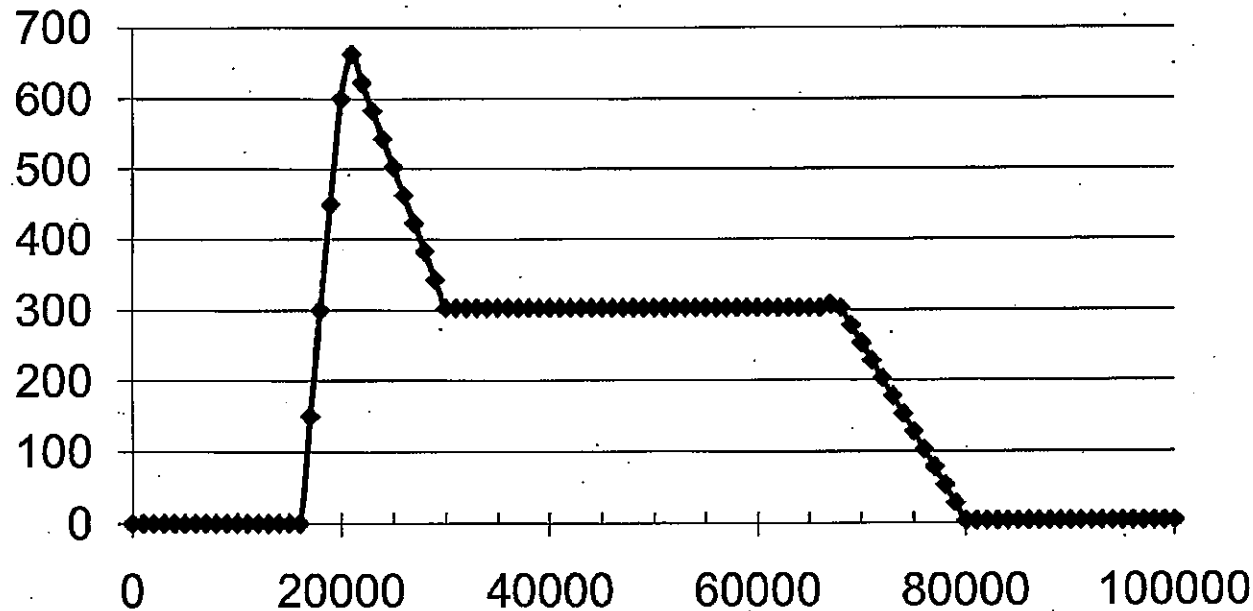
Pure Tax Gain from Clean Energy Tax Changes by Annual Gross Income (\$/yr)



Results: Clean Energy Future 2012-2013

- Every taxpayer a winner

**Pure Tax Gain from Clean Energy Tax
Changes by Annual Gross Income
(\$/yr)**



Details of the changes: 'Carbon Tax'

	July 2011 (base)		CEF 2012-2013		CEF 2015-2016	
Tax schedule	Threshold	Rate	Threshold	Rate	Threshold	Rate
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Pensions & Allowances	Current	

'Carbon Tax'

- Details of the simulated changes:
- Tax Cuts
 - Lifting the tax-free threshold (“tripling”)
 - Tweaking rates
- Increased Family Payments, Pensions and Allowances, but.....
 - Increases paid as tax exempt 1.7% supplement
 - Paid as upfront lump sum (2012); From 2013 fortnightly
 - Introduces new \$300 Single Income Family Supplement
 - Introduces new \$300 Low Income Supplement

Examples of applications

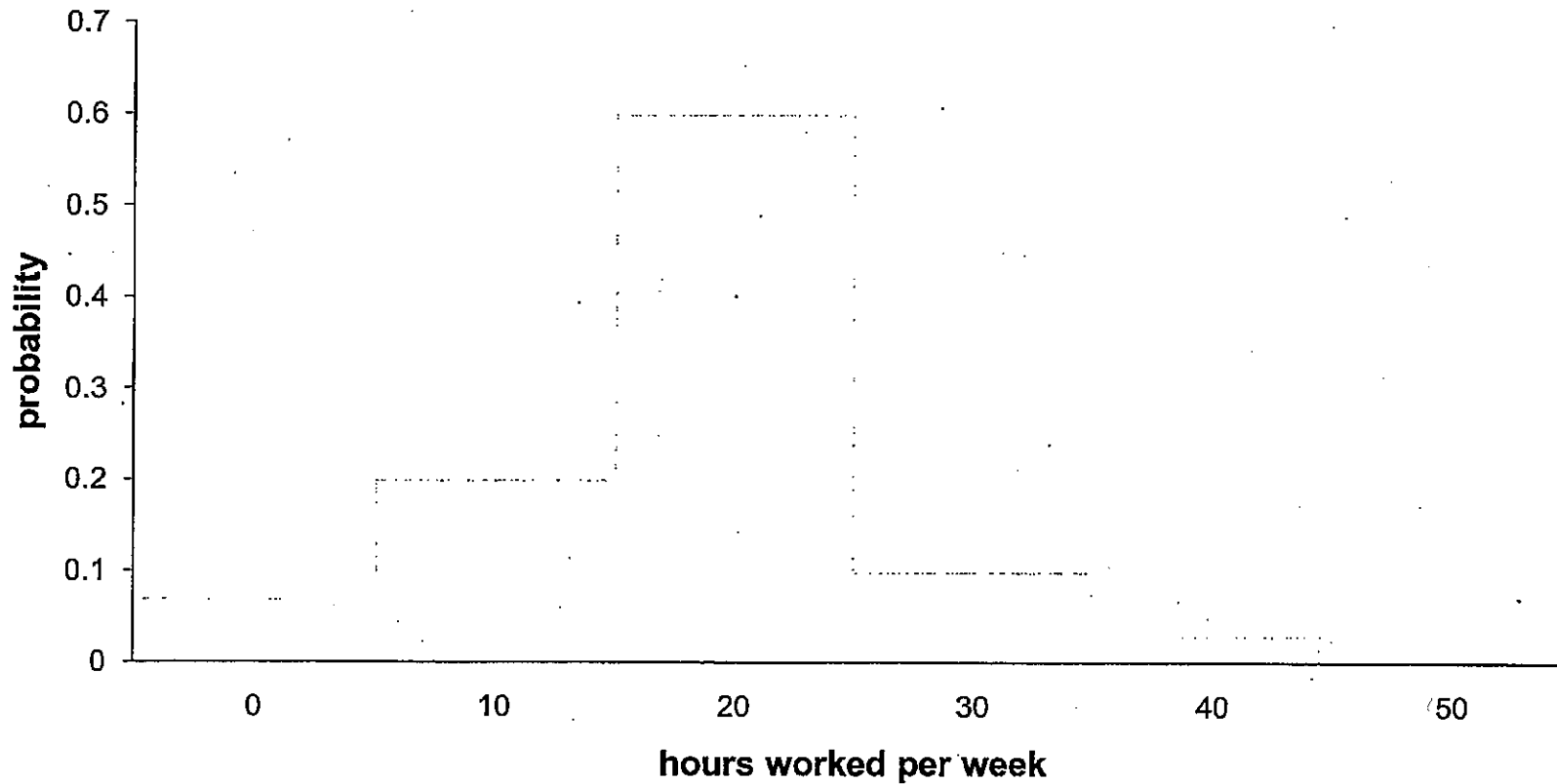
- Securing a Clean Energy Future (CEF or 'Carbon Tax') proposals
- Australia's Future Tax System (AFTS or 'Henry Review')
 - ideas discussed in a Treasury report
- Australian New Tax System in 2000
- Extension of Childcare Tax Rebates
- Show a few results for the first two most recent examples

Limitations

- Policy changes have to be of a financial nature
 - Changes to the rules of the tax and transfer system
 - Changes to gross wages
- Only household side of the economy
 - Can incorporate some extensions to correct up to a point
 - Micro-macro linkage is used to a limited extent
- No time path but instantaneous change, no dynamics in the model
- No explicit consumption in the model

Probability of labour supply

Empirical probability of an individual's labour supply



Behavioural simulation

- Obtain population level simulation by drawing repeatedly for each household.
- Same error terms are used before and after the policy change.
- Outcome is a frequency distribution for each individual over the discrete hours points after the change, based on the draws taken.
- Each hours point for a household is associated with a level of gross and net income, social security income and tax payments
- Let individuals optimise work/leisure choice subject to the changed budget constraint
- Effect on government expenditure on social security and revenue from income tax can be calculated taking into account labour supply responses, using expected expenditure and revenue for individual households and weights provided with the data.
- Aggregate labour supply responses and other outcomes can be reported, using weights provided with the data.

Simulated labour supply

- To simulate the labour supply response, net incomes are again calculated at each of the points before and after a reform.
- Using the estimated parameters, utility at each of the points is calculated.
- The point with optimal utility is chosen, allowing for the stochastic utility component (a random draw from the Extreme Value type I distribution).
- Labour supply models can be adapted to suit the specific issue of interest; e.g. allowing for childcare costs

Labour supply model

- Labour supply models used in microsimulation are usually structural discrete choice models, allowing for a fixed number of labour supply points
- In our case: separate models for single men, women and parents: 11 discrete choices; and joint model for partnered men and women: 66 (6 x 11) choices
- The model is based on household utility ($U = u(\text{"leisure"}, \text{net income}) + \text{random component}$).
- Utility parameters depend on individual and household characteristics (e.g. age and number of children), so choice of labour supply depends on these as well
- To estimate the labour supply model, net incomes are calculated at each of the labour supply points. They are used as input in the model.

Microsimulation modelling

- Consider two types in this presentation:
- Static (MITTS-A, TaxMod-A, Taxwell)
 - Replication of income tax and social security rules for a sample of the population
 - Base samples: Detailed survey data on households.
 - In Australia: Survey of Income and Housing Cost (SIHC) collected by the Australian Bureau of Statistics
 - In New Zealand: Household Economic Survey (HES), collected by Statistics New Zealand
- Behavioural (MITTS-B, Taxmod-B)
 - Allows individuals to change labour supply (in the static component, labour supply is fixed to the observed level)
 - Labour supply responses are based on an underlying labour supply model which is estimated on a few years of the SIHC/HES

Outputs of microsimulation

- Examples of outputs are:
 - Winners/losers tables
 - Income distribution measures (inequality/poverty)
 - Welfare measures (based on net income/money metric measures)
 - Govt. expenditure changes
 - Labour supply changes/transition matrices
 - Marginal effective tax rates/budget constraints

What do microsimulation tax models do?

- Calculation of individual net incomes starting from gross incomes, disaggregating into separate components.
- Aggregation of results to population level:
 - Government expenditure on allowances/ pensions and revenue from income tax
- Computing the effects of policy changes on net incomes (individual and aggregate) and government expenditure and revenue
- Computing the effects of policy changes on labour supply (individual and aggregate)
- Study distributional implications of policy changes
 - Based on income or welfare

Where have we used microsimulation

- For government departments regarding tax and social security policy changes
 - In election campaigns to advice regarding proposed policies.
 - For lobby groups, to evaluate policy ideas and provide estimated costings
 - For the media, analyse the effect of current policies and compare to alternatives
-
- Emphasis is on labour supply implications

Target audience

- Federal/State government departments, lobby groups, media
 - Labour supply/labour force participation
 - Costs of policy changes in tax and social security
 - Distributional effects of reforms
- Academic researchers
 - Development of new measures
 - Extensions of the modelling

Objective of the presentation

- Describe microsimulation modelling (using the specific application of the Melbourne Institute Tax and Transfer Simulator (MITTS))
 - How is it done
 - What can it be used for
 - Explain limitations
 - Output that is generated
 - Show its potential contribution through some examples

Outline

- Objective of the presentation
- Description of microsimulation modelling
- Examples of microsimulation modelling
- Show two sets of results
 - Securing a Clean Energy Future (CEF or ‘Carbon Tax’)
 - Australia’s Future Tax System (AFTS or ‘Henry Review’)
- Concluding remarks