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Analysing tax and social security policy: examples from Mexico and the UK

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Analysing tax, benefits and pensions policy

- Quantitative analysis of tax, benefits and pensions policy is important input in policy-making and evaluation process
  - Assessing the distributional impact of system or reforms
  - Assessing impact on behaviour and economic efficiency

- IFS analysis of tax policy in UK relies a lot on this
  - Analysing distributional impact of government budget measures
  - Suggesting improvements to UK tax system (the Mirrlees Review)

- IFS researchers have also been involved in analysing policy in middle income countries:
  - Study of tax reforms in Mexico and El Salvador (World Bank)

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What's coming up?

- Methodological issues:
  - What kind of models?
  - How to assess the distributional impact of reforms

- A tax-microsimulation model for Mexico: MEXTAX

- Using microsimulation for UK tax system design: TAXBEN

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Methodological Issues

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A static or dynamic models?

- Static models simulate impact of reform at one point in time
  - Only single cross-section of data required
  - No need to project forward population dynamics
  - But can change the point in time to apply a model
- Dynamic models simulate the impact of a reform over time
  - Simulate population dynamics (e.g. future earnings/employment, fertility, health status, etc)
  - Demographic projections usually require panel data to estimate
- What model to use depends on policies in question
  - e.g. distributional impact of income tax change: static suitable
  - e.g. impact of change in social security contributions and pension entitlement rules on pension costs and payments: dynamic required
- Today, discuss static models

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Allow for behavioural response?

- No-behavioural response modelling is most common
  - Easier to do than modelling behaviour
  - Reasonably approximation for many kinds of small reforms
  - Can give upper (lower) bounds on household static welfare costs (gains) from tax increases (cuts)
- But reforms can cause large changes in behaviour
  - Changes in how much people work or the income they generate
  - Changes in what people buy and consume
- Behavioural microsimulation models allow such responses
  - Sometimes very important: e.g. revenues from UK's 50% income tax
  - Can better investigate 'good' policy
  - Important to realise estimated responses are subject to uncertainty

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How to assess distributional effects?

- How to rank households as rich or poor: income or expenditure?
  - Both suffer from measurement error and are volatile
  - Borrowing and saving mean rank people differently
  - Probably worthwhile looking at impacts over both income and expenditure distributions
- Relative gains/losses: proportion of income or expenditure?
  - Borrowing and saving mean dividing by income or spending can give very different answers
  - Best to divide gains/losses from direct changes by income, gains/losses from indirect changes by expenditure
- Also look at gains/losses in cash terms
  - Policy may redistribute proportionally but not in cash terms

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Analysing Reforms in Mexico

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MEXTAX – our simulator (I)

- We developed a tax microsimulation model for Mexico called MEXTAX
  - Included income tax, indirect taxes and social security contributions
  - Simulate these and other reforms to the tax system

- Want to use this to
  - Estimate revenues from tax increases
  - Estimate the distributional impact
  - Model the impact on work, consumption
  - Allow for less-than-full pass through of VAT to consumer prices
  - Take into account the fact that informality means much activity is not taxed

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MEXTAX – our simulator (II)

- Built and runs using Stata
  - Widely available econometrics program, but requires some basic knowledge of the language
  - Users edit an 'interface' and 'parameters' modules
  - No need to edit calculation code unless *very* major reforms (e.g. Shift from individual to joint taxation)

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Parameters module

Untitled1.do | params_2008.do

```
*****************************************************************
********************** INCOME TAX ***************************
*************************************************************

******** INCOME TAX EXEMPTIONS ********

scalar NUMSOURCES = 20

**** MONETARY AMOUNTS ****

scalar EXEMPT1 = 0
scalar EXEMPT2 = 0
scalar EXEMPT3 = 1577.7
scalar EXEMPT4 = 1577.7
scalar EXEMPT5 = 788.85
scalar EXEMPT6 = 788.85
scalar EXEMPT7 = 1000000000
scalar EXEMPT8 = 0
scalar EXEMPT9 = 100000000
scalar EXEMPT10 = 1000000000

foreach X of numlist 11(1)20 {

      scalar EXEMPT`X' = 1000000000

}

**** PERCENTAGES ****

scalar PEXEMPT1 = 0
scalar PEXEMPT2 = 0.5

foreach X of numlist 3(1)20 {

      scalar PEXEMPT`X' = 0

}

scalar MPEXEMPT1 = 0
scalar MPEXEMPT2 = 13673.4

foreach X of numlist 3(1)20 {

      scalar MPEXEMPT`X' = 0

}
```

Untitled1.do | params_2008.do

```
******** INCOME TAX THRESHOLDS ********

scalar NUMBANDS = 8

scalar BAND0 = 0
scalar BAND1 = 5952.84
scalar BAND2 = 50524.92
scalar BAND3 = 88793.04
scalar BAND4 = 103218.00
scalar BAND5 = 123580.20
scalar BAND6 = 249243.48
scalar BAND7 = 392841.96
scalar BAND8 = 1000000000

******** INCOME TAX RATES ********

scalar RATE1 = 0.0192
scalar RATE2 = 0.064
scalar RATE3 = 0.1088
scalar RATE4 = 0.16
scalar RATE5 = 0.1792
scalar RATE6 = 0.1994
scalar RATE7 = 0.2195
scalar RATE8 = 0.28

******** INCOME SUBSIDY LIMITS ********

scalar NUMCREDS = 11

scalar LCRED0 = 0.01
scalar LCRED1 = 21227.52
scalar LCRED2 = 31840.56
scalar LCRED3 = 41674.08
scalar LCRED4 = 42454.44
scalar LCRED5 = 53353.80
scalar LCRED6 = 56606.16
scalar LCRED7 = 64025.04
scalar LCRED8 = 74696.04
scalar LCRED9 = 85366.80
scalar LCRED10 = 88587.96
scalar LCRED11 = 1000000000
```

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Running the program

```
.
.
. program set_propwages
  1.
.         version 11
  2.
.         global prop_wages = `1'
  3.
. end

.
. program set_adout_ind
  1.
.         version 11
  2.          syntax anything
  3.
.         global outdata_ad_ind    `anything'
  4.
. end

.
. program set_logdec_ind
  1.
.         version 11
  2.          syntax anything
  3.
.         global logfiledecile_ind         `anything'
  4.
. end

.
. program set_loghh_ind
  1.
.         version 11
  2.          syntax anything
  3.
.         global logfilehhtype_ind         `anything'
  4.
. end

.
. program set_logrev_ind
  1.
.         version 11
  2.          syntax anything
  3.
.         global logfilerevenue_ind        `anything'
  4.
. end

.
end of do-file

. set_country "mexico"

. set_systems 2010 20112 20113

. set_defaults

.
```

Command

simulator

CAP NUM OVR

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MEXTAX – our simulator (II)

- Built and runs using Stata
  - Widely available econometrics program, but requires some basic knowledge of the language
  - Users edit an 'interface' and 'parameters' modules
  - No need to edit calculation code unless *very* major reforms (e.g. Shift from individual to joint taxation)
- Outputs individual, household files and summary distributional and revenue statistics
- Being developed into LATAX
  - Tax simulator for Latin America where choose country
  - Scope for adding additional features like subsidies, cash transfers etc.

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MEXTAX: Coping with poor quality income data

- Household surveys often fail to pick up all income sources or all types of spending
  - Especially the case for savings/investments income
  - Or spending on things like alcohol or tobacco

- Researchers in Latin America typically responded by multiplying reported incomes by fixed factors so match National Accounts
  - What if under-reporting is concentrated amongst certain people? (e.g. the rich)
  - What if some people do not under-report but completely forget about a source of income?

- We tested sensitivity of results to these assumptions

- Provides info but not solve problem – need better data

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MEXTAX: What happens to behaviour?

- People may work less or shift to the informal sector when their taxes go up
  - Tax increase raise less revenue or even reduce revenue

- No good estimates of labour supply responses to taxation for Mexico
  - Assess how much revenue would be raised under different assumptions about how responsive people are

Reform	Baseline Revenue	"Low" Response	"Medium" Response	"High" Response
Total	50,550	48,710	46,880	43,180

- Similar approach could be used elsewhere until more evidence on how responsive people actually are
  - Taking account of reductions in work effort can make important differences to results

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MEXTAX: analysing 2010 tax reforms (I)

- Increases in tax rates in 2010 to reduce government deficit

- Initial proposals included
  - Substantial expansion in indirect (VAT) base (new 2% uniform VAT on top of existing VAT)
  - Increases in various income tax and duties rates

- Approved reform was a much reduced version of this, in particular replacing new 2% uniform VAT with 1% increase in existing VAT
  - Part of reason proposals rejected is seen as “regressive”
  - Proper quantitative analysis can help assess whether this was the case

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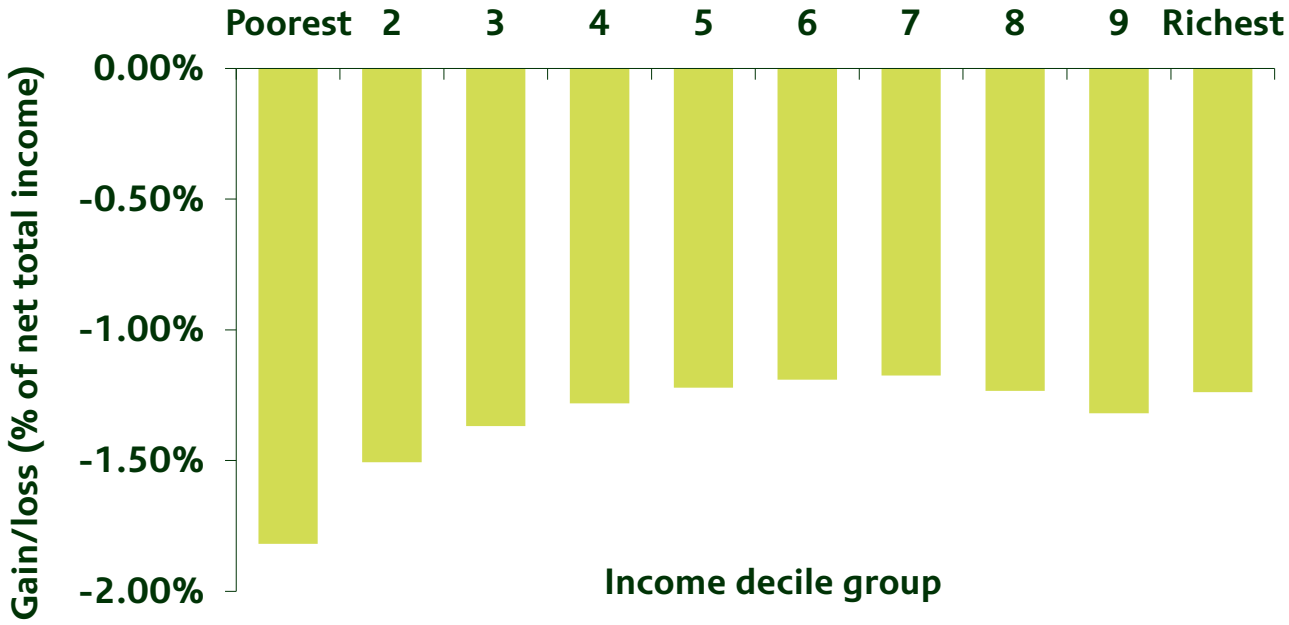
MEXTAX: analysing 2010 tax reforms (II)

Proposed reforms: losses measured as % of income



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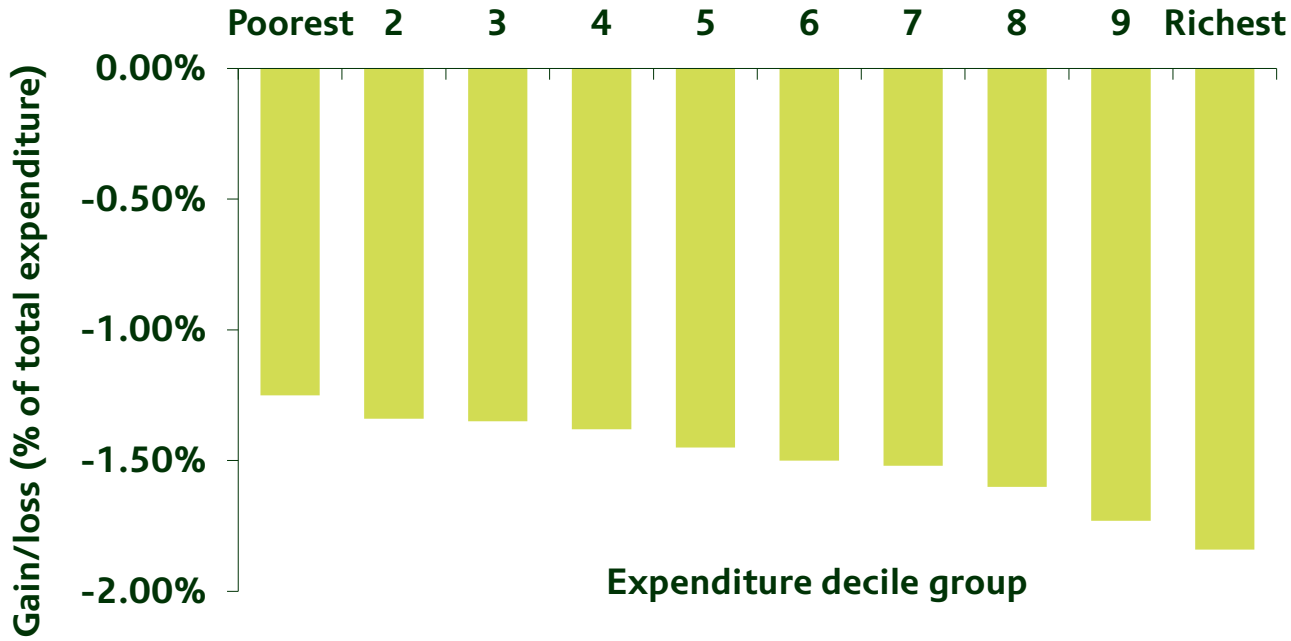
MEXTAX: analysing 2010 tax reforms (III)

Proposed reforms: losses measured as % of expenditure



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Utilising behavioural modelling in MEXTAX

- Changes in VAT rates on different goods may cause people to change their spending patterns
  - e.g. buy more food because of lower rate of VAT on it

- We estimated how spending patterns respond to changes in taxes using info on how spending patterns related to changes in prices over time and across Mexico
  - Spending patterns do respond
  - But only a small effect on revenue and distributional impact of reforms

- Also used model to examine a broad uniform VAT in Mexico
  - Efficiency gain equal to 0.1% of aggregate expenditure
  - But evidence of interactions between consumption and labour supply which may undermine case for uniform VAT

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Analysing Policy in the UK

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TAXBEN

- Long-standing IFS tax/benefit micro-simulation model
  - Historical systems back to 1975, highly detailed
  - Easily make basic changes in graphical 'front-end'
  - Able to code up major reforms and analyse

- Used to analyse distributional, revenue and work-incentive impact of policy changes and budget measures
  - Day after budget we have full set of results to present to media and stakeholders

- But also used in more fundamental analysis of tax system
  - e.g. the Mirrlees Review

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Reforming the UK VAT: analysis with TAXBEN (I)

- One of the key recommendations of Mirrlees Review is to move to single rate of VAT on (nearly) all goods and services
  - But this is regressive
  - And would damage work incentives

- Use TAXBEN to analyse the impact of reform and design compensating cuts in other taxes and increases in benefits
  - On average, distributionally neutral
  - On average, not worsen work incentives

- TAXBEN also used with demand model to look at welfare gains from uniformity
  - Around 0.1 – 0.2% of consumer spending

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Reforming the UK VAT: analysis with TAXBEN (II)

- After trial-and-error, following reform looked workable:
  - VAT at 20% on all items
  - Automatic increase of 3.4% in all tax allowances, thresholds, benefit and tax credit rates (because indexation to prices)
  - Further increases in certain benefits
  - Cuts in tax rates, increase in tax-free allowance, slightly lower higher-rate income tax threshold

- Difficult to assess distributional impact of reforms when both direct and indirect taxes are affects
  - By income and expenditure distributions, % of income and spending

- Also calculate marginal tax rates and participation tax rates to look at work incentive effects

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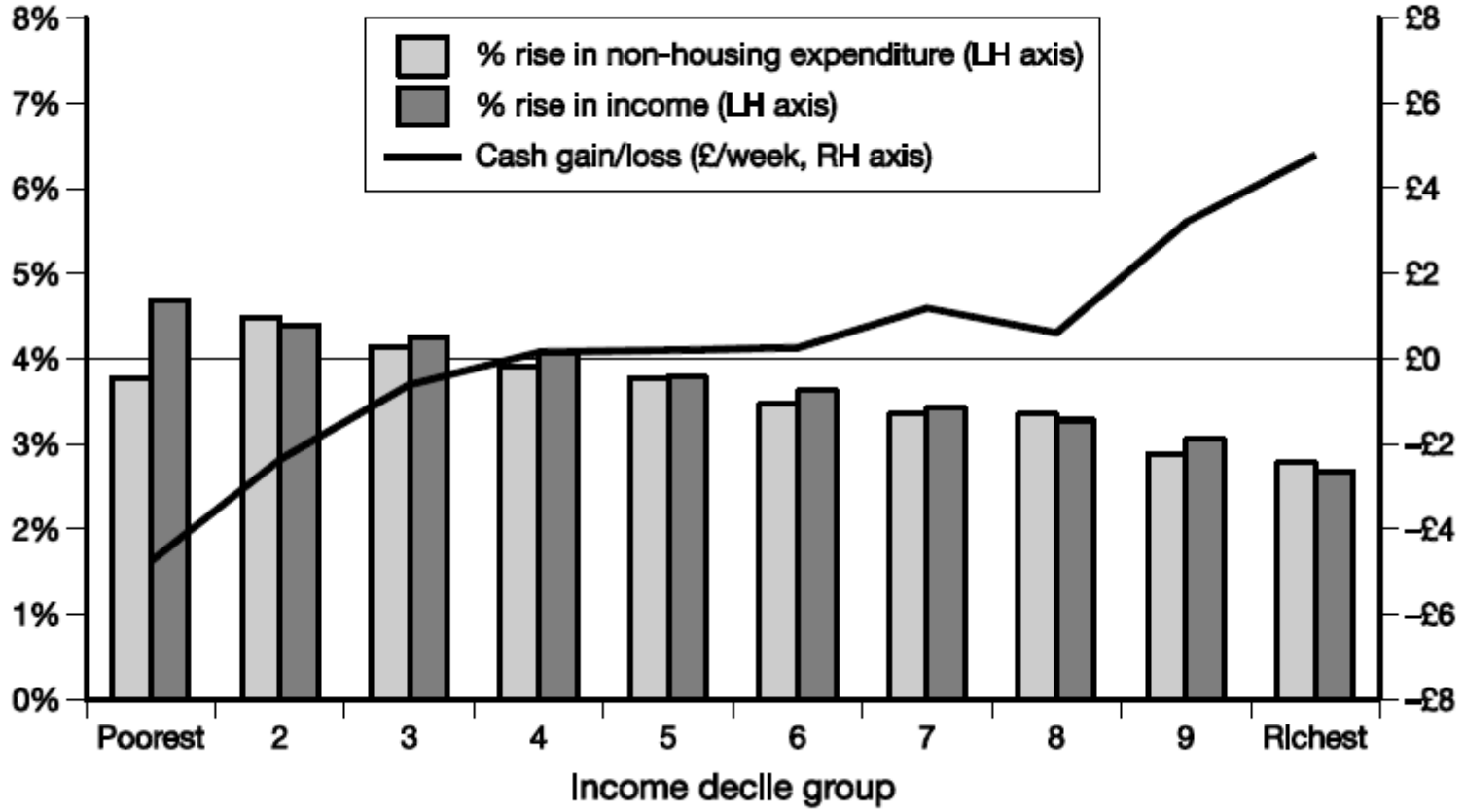

Figure 9.1. Effect of reform by income decile

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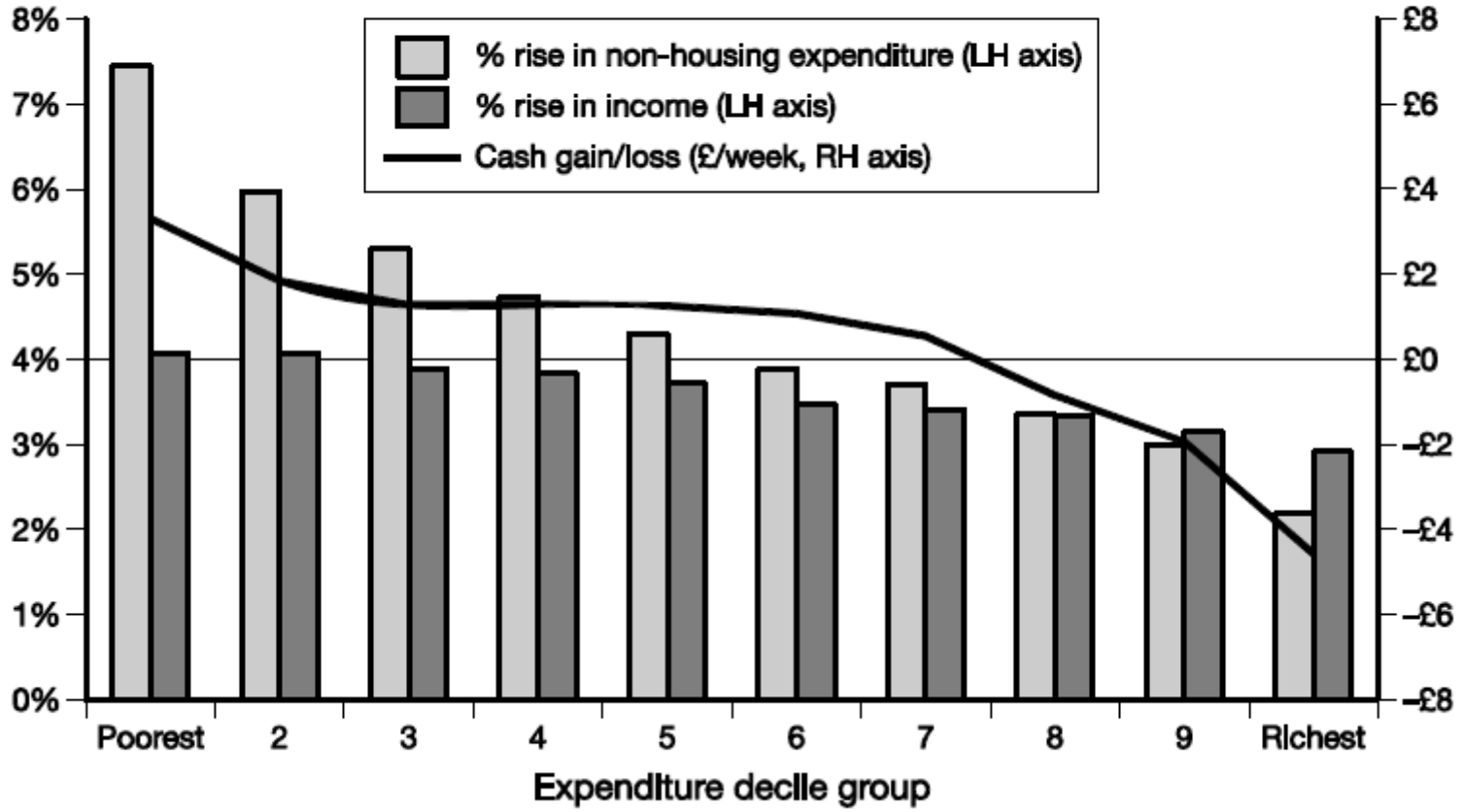

Figure 9.2. Effect of reform by expenditure decile

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Conclusions

- Quantitative analysis of tax, benefits and pensions policy is useful

- Different ways of building models
  - Relatively simple like MEXTAX
  - Highly detailed like TAXBEN

- But have to be aware of the limitations
  - Data
  - Behavioural response
  - How to decide something is progressive or regressive?

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