An international comparison of savings rates from microdata and national accounts

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*Note: Very preliminary and exploratory

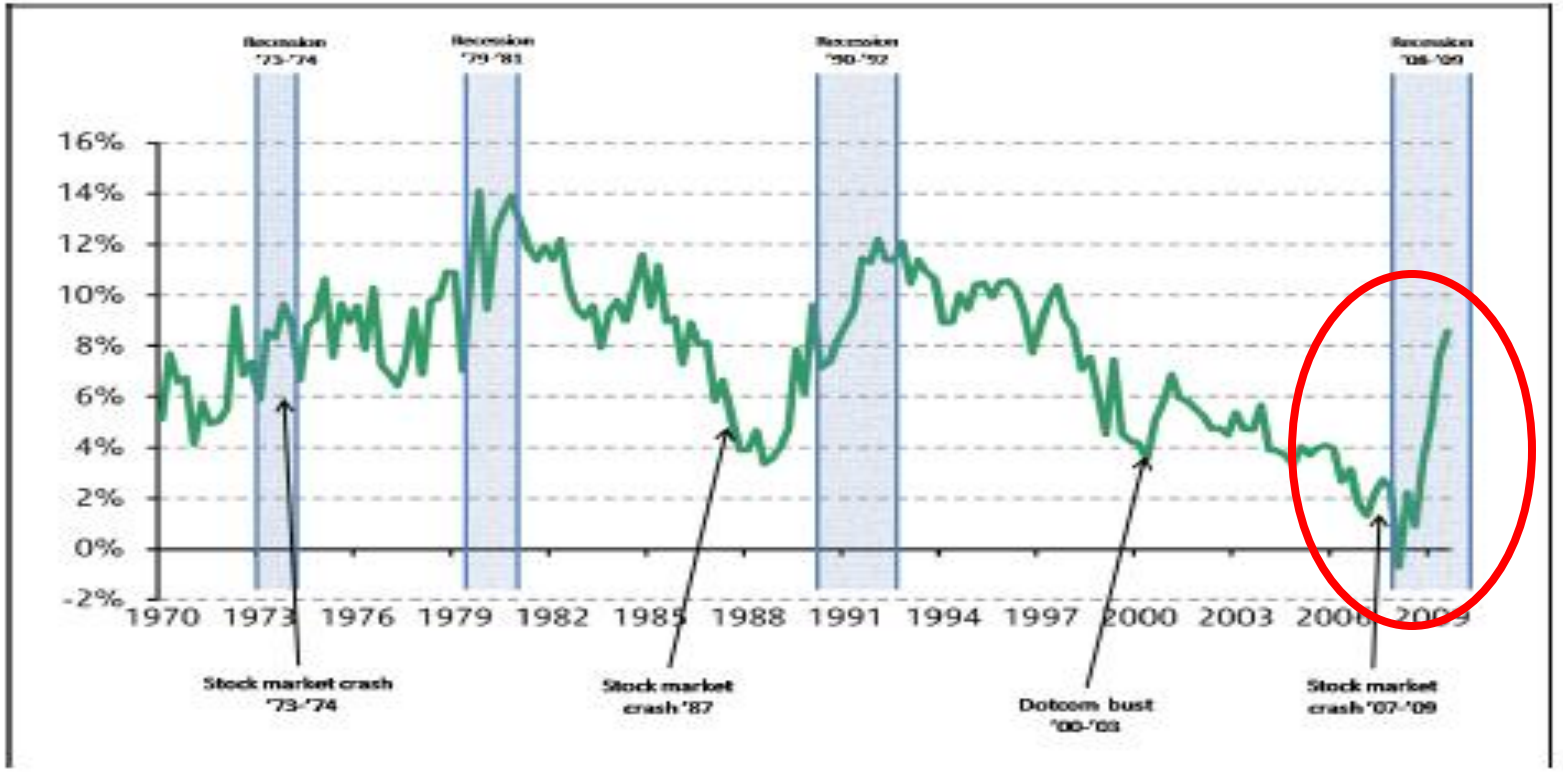
Comments welcome

Why does this matter?

- Important to know who is (not) saving
  - Saving adequacy/retirement preparation
  - Distinguish between alternative explanations for aggregate movements

- Quality of micro data on consumption expenditure
  - Active literature (e.g. Garner et al 2009, Battistin Padula 2009, others)
  - Looking at savings (income and consumption) can provide additional insight.

Understanding Aggregate Movements in Saving



- UK Aggregate Personal Sector Saving Rate

Understanding Aggregate Movements in Saving

An Example:

- Alan, Crossley and Low (2010) show that the recent dramatic increase in savings rate can be generated in a life-cycle model with stable preferences
- In the their model, agents face a probability of a recession and a probability of a stock market crash
- Recessions bring a temporary increase in variance of uninsurable idiosyncratic shocks to permanent income (Blundell, Pistaferri and Preston, 2009; Blundell, Low and Preston, 2009)

Example: Alan, Crossley, and Low (2010)

- The financial crisis raises saving through two channels
  - Wealth losses: *permanent* increase in savings rate
  - Uncertainty/buffer stock: *temporary* increase in saving

- Can distinguish these stories in micro-data

  - But for this we need to know how to relate micro to macro.

Framework

$$S^*_{k,c,t} = 1 - \frac{C^*_{k,c,t}}{Y^*_{k,c,t}}$$

$$\approx -\log\left(1 - S^*_{k,c,t}\right) = \log Y^*_{k,c,t} - \log C^*_{k,c,t}$$

$$= y^*_{k,c,t} - c^*_{k,c,t}$$

- Where *k* indexes measures (*NA* = National Accounts, *S* = survey, *A*=Adjusted (Cash Basis) National Accounts), *c* indexes countries (UK, US, Can, Aus), and *t* indexes time. * denotes "true" and small letters denote logs.

Conceptual Differences

$$c^*_{NA,c,t} = c^*_{S,c,t} + \alpha_{c,t} + v_{c,t}$$

$$y^*_{NA,c,t} = y^*_{S,c,t} + \delta_{c,t} + u_{c,t}$$

- Where α and δ are conceptual differences which we can correct for; *v* and *u* are conceptual differences we can't correct for.
- Denote adjusted (or cash basis) national account measures by *ANA*:

$$c^*_{ANA,c,t} = c^*_{S,c,t} + v_{c,t}$$

$$y^*_{ANA,c,t} = y^*_{S,c,t} + u_{c,t}$$

$$S^*_{ANA,c,t} - S^*_{S,c,t} \approx \log\left(1 - S^*_{ANA,c,t}\right) - \log\left(1 - S^*_{S,c,t}\right) = u_{c,t} - v_{c,t}$$

Key Conceptual Differences

- Main correctable conceptual differences are
  - Noncash items: e.g. Imputed rent, imputed income/expenditures from pensions/insurance
  - Net vs. gross concept for insurance
  - Categories specifically for NPISH

- Main uncorrectable conceptual differences are
  - SNA includes NPISH; In Canada unincorp. business in 'household' sector
  - Micro survey frames miss some households
  - Overseas expenditures treated differently

Measurement Error

$$c_{k,c,t} = c^{*}_{k,c,t} + \varepsilon_{k,c,t}$$

$$y_{k,c,t} = y^{*}_{k,c,t} + \eta_{k,c,t}$$

$$S_{k,c,t} \approx S^{*}_{k,c,t} + \eta_{k,c,t} - \varepsilon_{k,c,t}$$

- In addition to these conceptual errors, there will also be measurement error in each source.
  - National accounts are revised, rebalanced. The allocation of expenditures to household sector is inexact.
  - Surveys suffer from non-response, and mis-reporting by those who respond.

Putting it together

$$S_{ANA,c,t} - S_{S,c,t} \approx \underbrace{\left(u_{c,t} - v_{c,t}\right)}_{\text{Uncorrectable Conceptual Differences}} + \underbrace{\left(\eta_{ANA,c,t} - \varepsilon_{ANA,c,t}\right)}_{\text{Measurement Error in National Accounts}} - \underbrace{\left(\eta_{S,c,t} - \varepsilon_{S,c,t}\right)}_{\text{Measurement Error in Surveys}}$$

Framework clarifies two issues:

1. Need something that varies over time:
   - An adjustment we cant make to SNA *C* or *Y* that varies over time
   - Error in SNA *C* or *Y* that varies over time
   - Error in Survey *C* or *Y* that varies over time

2. Measurement errors common to *C* and *Y* may cancel
   - eg., declining survey participation by more affluent households (their saving rate has to be different for this to matter, not just their level of income)

Game Plan

$$S_{ANA,c,t} - S_{S,c,t} \approx \underbrace{\left(u_{c,t} - v_{c,t}\right)}_{\text{Uncorrectable Conceptual Differences}} + \underbrace{\left(\eta_{ANA,c,t} - \varepsilon_{ANA,c,t}\right)}_{\text{Measurement Error in National Accounts}} - \underbrace{\left(\eta_{S,c,t} - \varepsilon_{S,c,t}\right)}_{\text{Measurement Error in Surveys}}$$

- We try to assess the importance of these different components
- One key idea: The methodology of Household Expenditures varies significantly across countries
- Thus international comparison might help

Household Expenditure Surveys

Country	Survey	Main Features
US	CEX	•Separate interview and diary Samples •Interview is quarterly recall •Considerable income imputation
UK	FES/EFS	•Mainly diary •Some recall - by same households (for larger items)
Canada	FAMEX/SHS	•Annual Recall •Balance edit •Crude reweighting to tax data on income •Unusually large samples (for provincial estimates)
Australia	HES	•Two-week diary for expenditures •Some recall - infrequent expenditure items •Personal Interview for current income, LFS

What we have done so far

Here are the things we are going to go through:

1. Graphs of macro micro comparisons across 4 countries
a) ‘raw’
b) adjusted

2. Explore some of the reasons for the observed differences
a) ‘balance edit’
b) Decline in coverage / decline in response rates
c) Decline in coverage rates in certain categories.

Digression on Aggregation (1)

$$\overline{\left(\frac{C}{Y}\right)} = \frac{1}{N}\sum\left(\frac{C}{Y}\right) \approx \frac{\overline{C}}{\overline{Y}} + \frac{1}{N}\sum\left(\begin{pmatrix} C-\overline{C} & Y-\overline{Y} \end{pmatrix} \begin{bmatrix} 0 & -1/\overline{Y}^2 \\ -1/\overline{Y}^2 & 2\overline{C}/\overline{Y}^3 \end{bmatrix} \begin{pmatrix} C-\overline{C} \\ Y-\overline{Y} \end{pmatrix} \right)$$

$$= \frac{\overline{C}}{\overline{Y}}\left(1 + \frac{2}{N}\sum\frac{\left(Y-\overline{Y}\right)^2}{\overline{Y}^2} - \frac{2}{N}\sum\frac{\left(C-\overline{C}\right)\left(Y-\overline{Y}\right)}{\overline{C}\overline{Y}}\right)$$

$$= \frac{\overline{C}}{\overline{Y}}\left(1 + 2\left(\frac{\sigma_Y}{\overline{Y}}\right)^2 - 2\rho_{Y,C}\frac{\sigma_Y}{\overline{Y}}\frac{\sigma_C}{\overline{C}}\right)$$

- Aggregate saving rate depends on only the average saving rate but also on dispersion of incomes.

Digression on Aggregation (2)

- Define household weights as the household's share to total income:

$$w_i = \frac{Y_i}{\sum Y_i}; \quad \sum w_i = 1$$

- Then

$$\sum w_i s_i = \sum \frac{Y_i}{\sum Y_i} \frac{Y_i - C_i}{Y_i} = \frac{1}{\sum Y_i} \sum Y_i - C_i = \frac{\sum (Y_i - C_i)}{\sum Y_i}$$

- Aggregate Saving Rate is a "plutocratic" measure.
- Will also compare to medians

What we do

Here are the things we are going to go through:

1. **Graphs of macro micro comparisons across 4 countries**
a) 'raw'
b) adjusted

2. Explore some of the reasons for the observed differences
a) 'balance edit'

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c) Decline in coverage rates in certain categories.

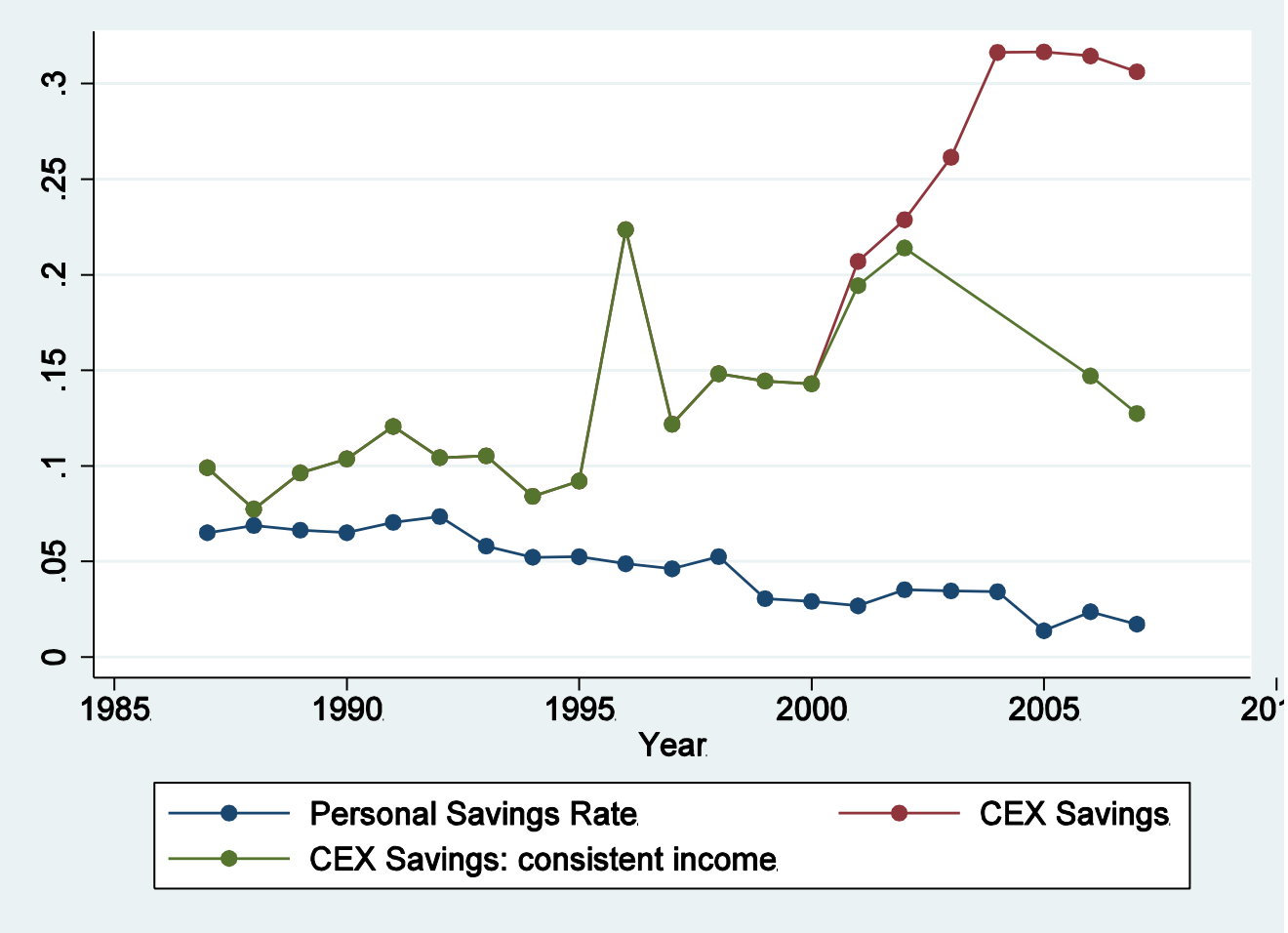
What's in the raw measures

National Accounts: Gross income less transfers less expenditures is savings, divided by gross income less transfers.

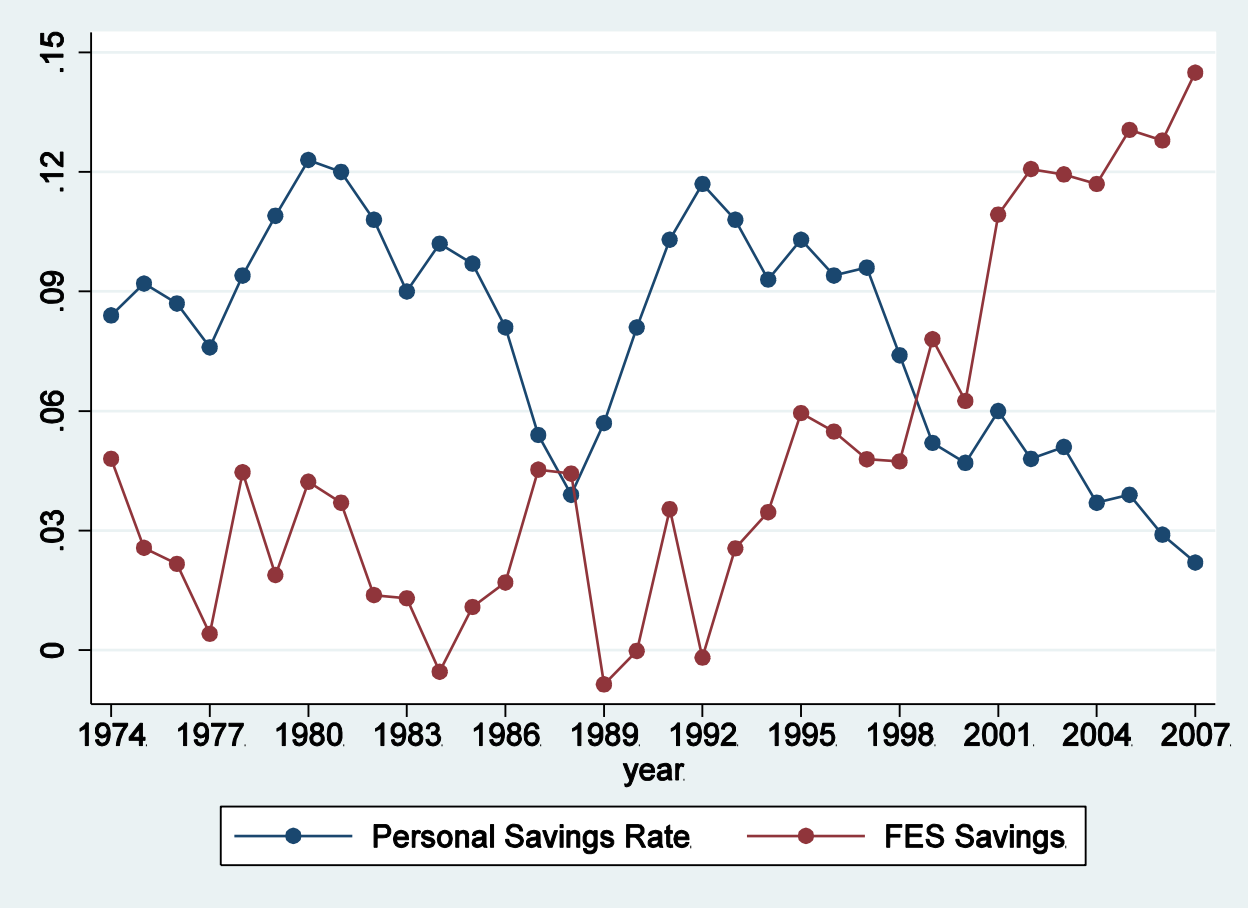
Survey: Cash income less taxes less cash expenditures, divided by cash income less taxes

What do these look like in our four countries?

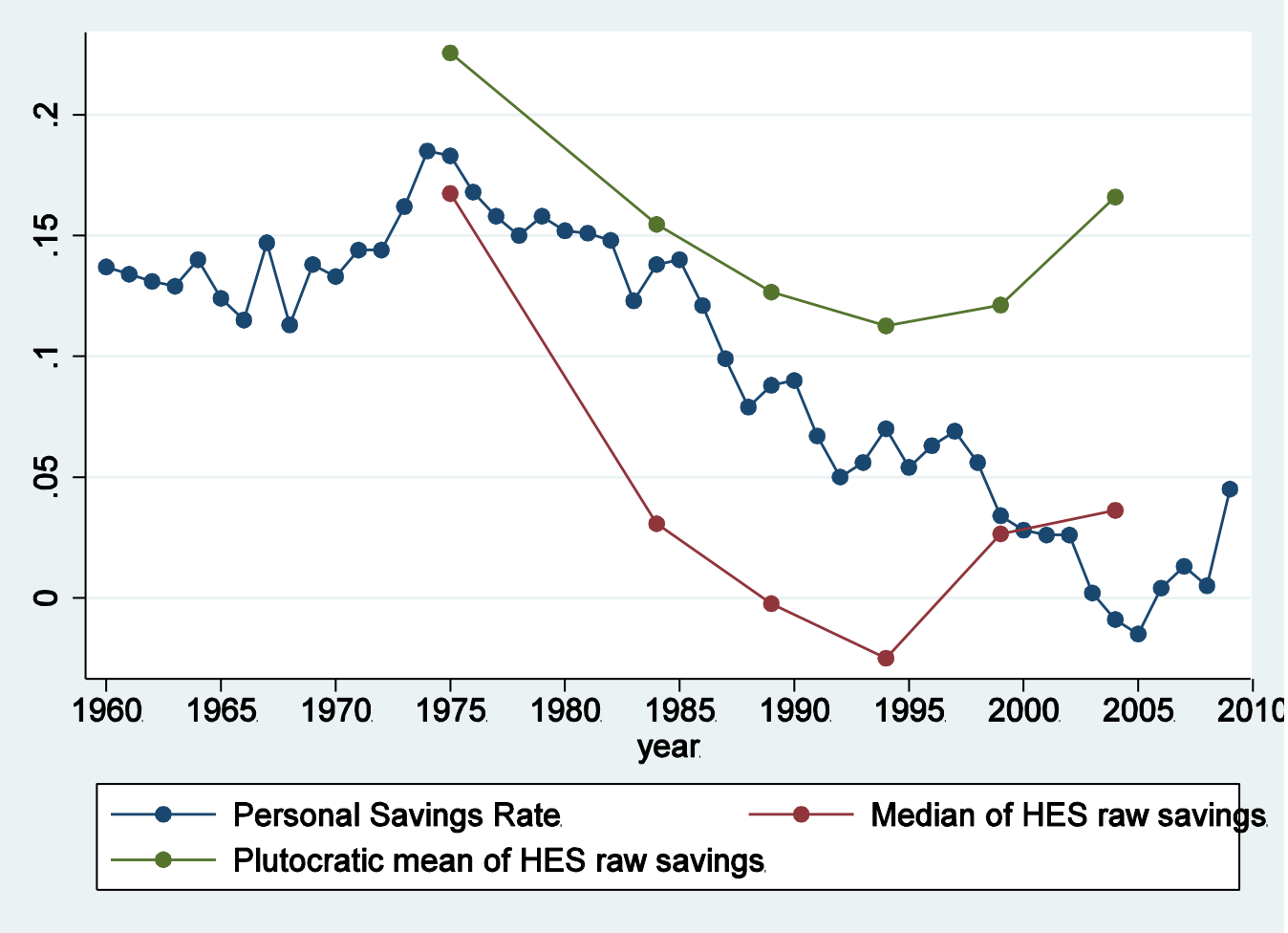
United States



United Kingdom



Australia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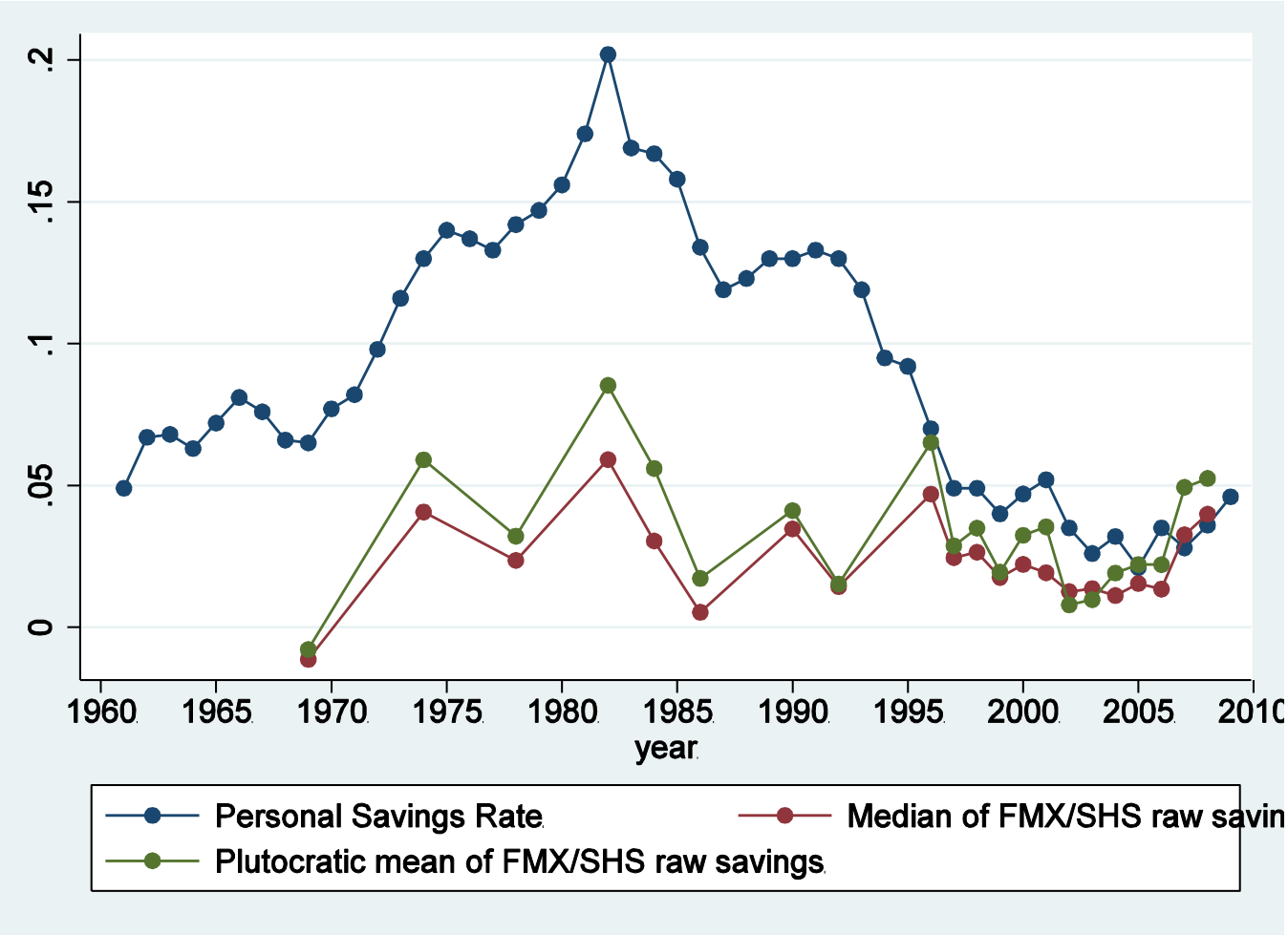
Personal Savings Rate
Median of HES raw savings
Plutocratic mean of HES raw savings

Canada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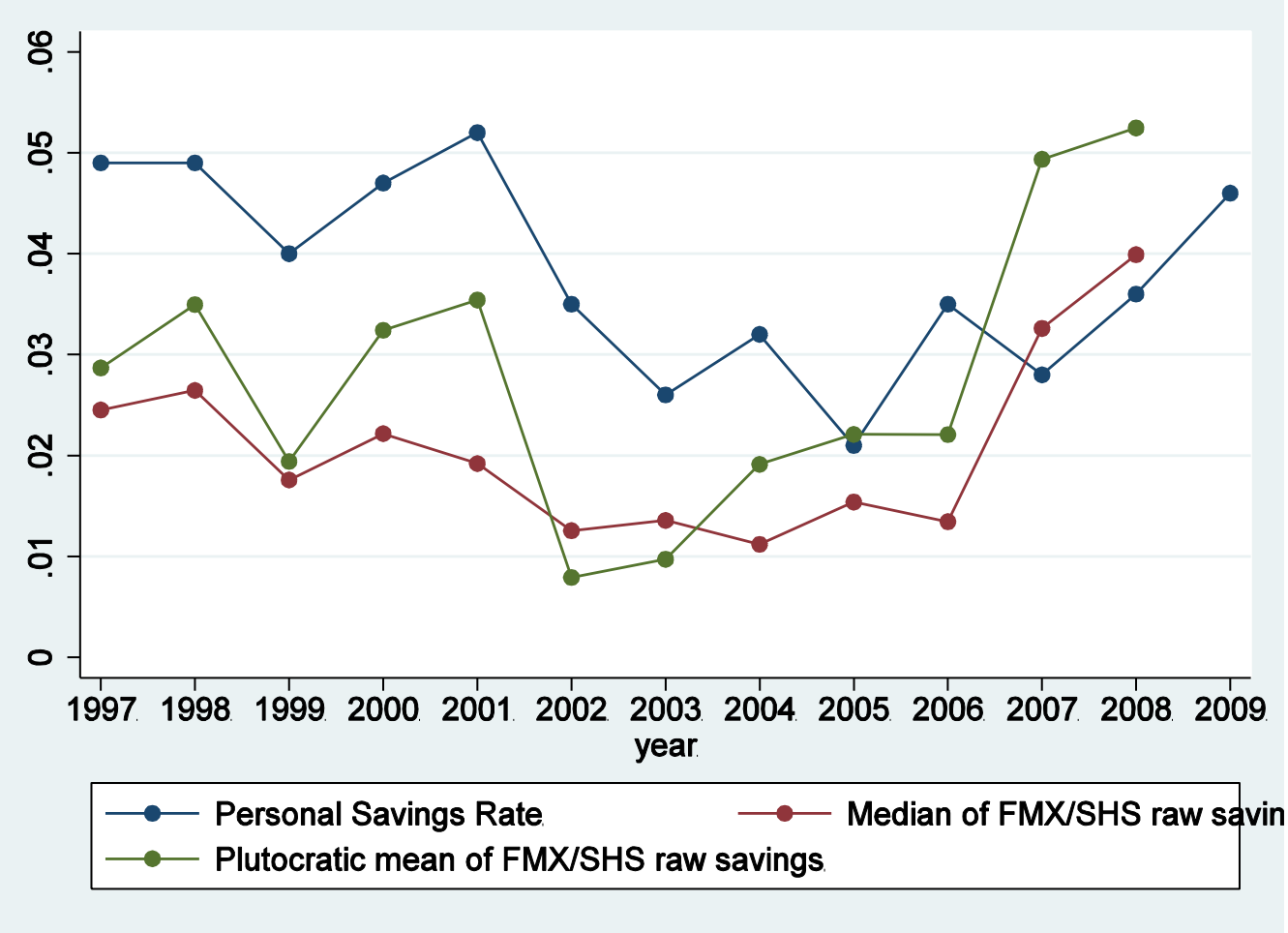
Plutocratic mean of FMX/SHS raw savings

Canada: 1997+ SHS era



Basic Savings: Summary

- In US and UK, micro savings increasing over last ten years, not matching SNA trends.
  - Is this because of worsening expenditure measurement?

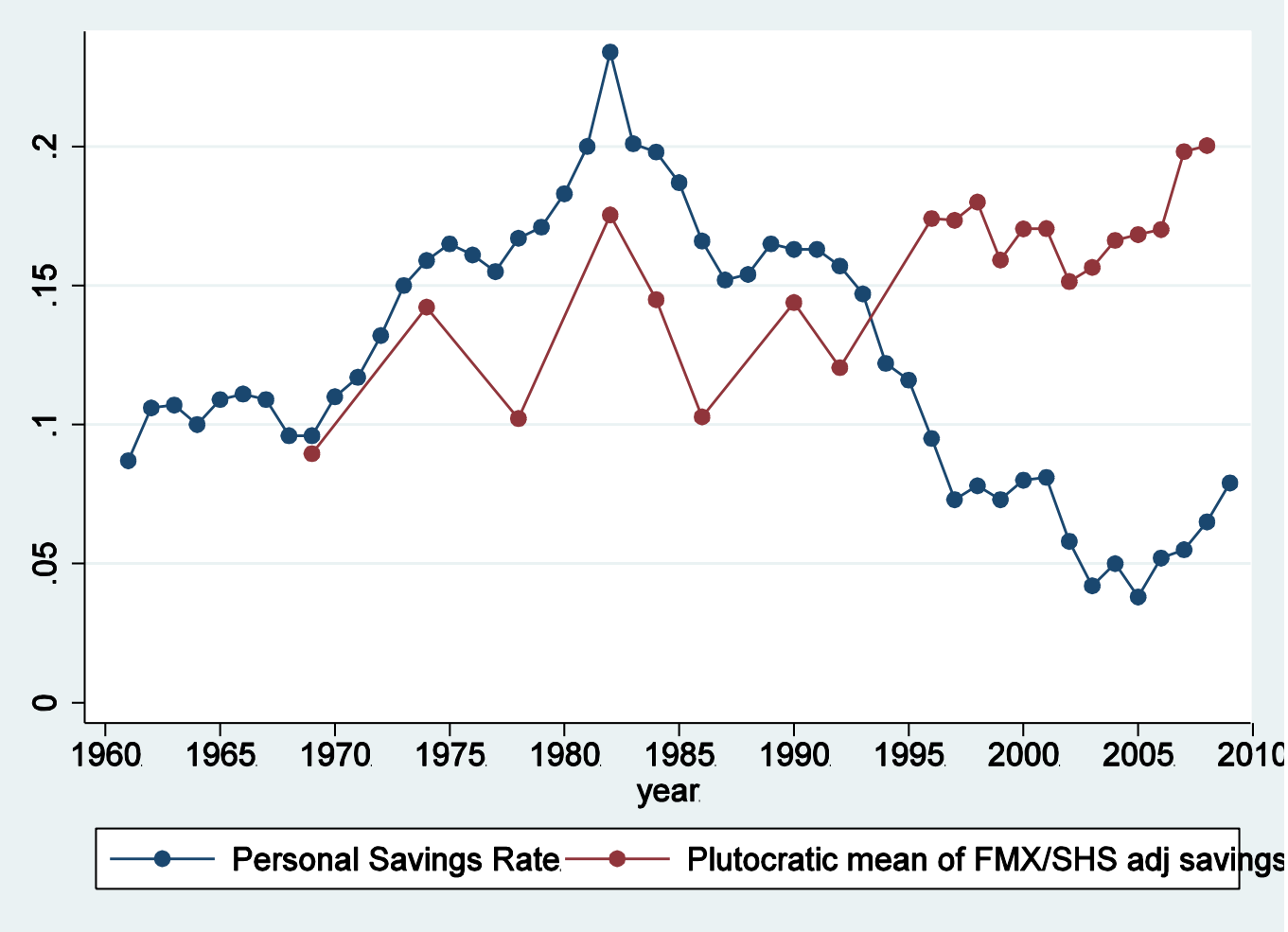
- In Australia and more so in Canada, micro follows macro.
  - We will explore possible explanations

- Next: Try to adjust both series to common base
  - Take out non-cash items from SNA, also adjust micro measures.

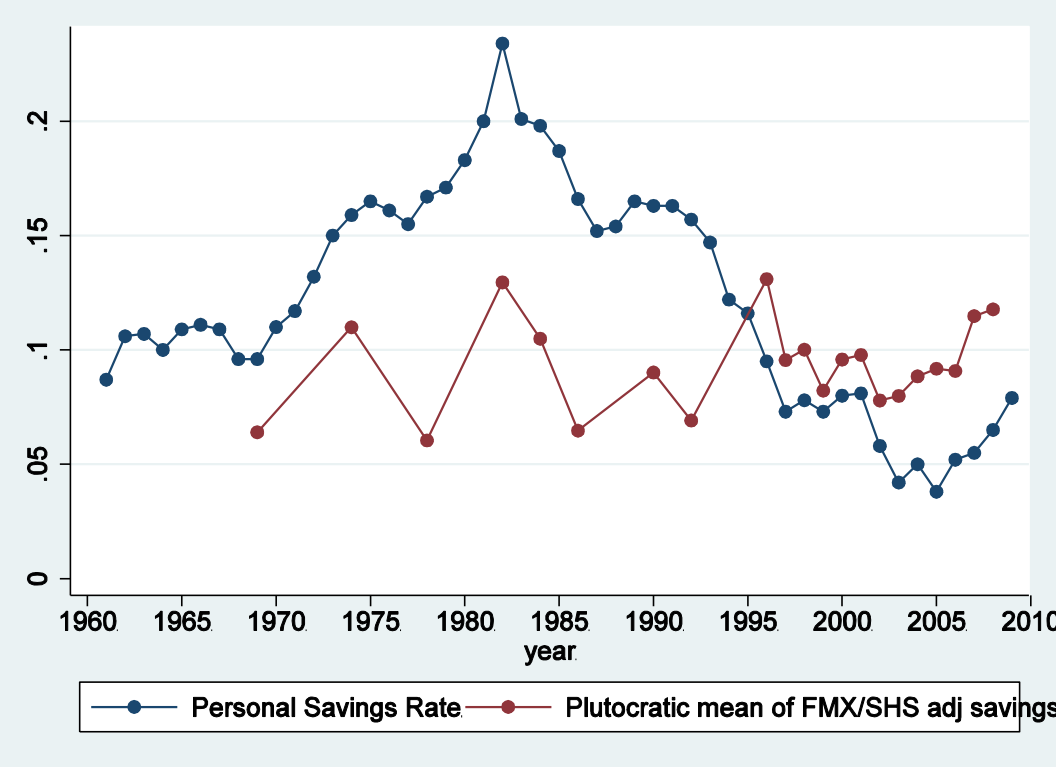
Canada Adjustments

- SNA:
  - Imputed rent
  - Operating expenses of non-profits
  - Health, auto, property insurance
  - Financial and legal services
  - Supplemental labour income
- SHS:
  - Health, auto, property insurance
  - mortgage

Canada: adjusted



Canada: adjusted, mortgage expensed



Summary of adjusted Series

- In Canada
  - Doesn’t have a large difference to trends
  - Shifting things like mortgage and insurance from savings to expense makes big difference to level.

What we do

Here are the things we are going to go through:

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a) ‘raw’
b) adjusted

2. Explore some of the reasons for the observed differences
a) ‘balance edit’

b) Decline in coverage / decline in response rates

c) Decline in coverage rates in certain categories.

Exploration #1: The Balance Edit 'experiment'

- We build and borrow from Brzozowski and Crossley (2010).

- Until 2006: pencil and paper in-person.
  - Included a "balance edit" check that flagged households that had expenditure +/- 20% from income + asset change.
  - Interviewer tried to get more information until difference was within 15%
  - After the check, if still out of balance you were discarded.
  - Statistics Canada reported most of the adjustment was to income and asset changes, not expenditures.

- In 2006, Statistics Canada adopted CAPI
  - NO balance edit.
  - number of unbalanced (>20%) records increased from 546 in 2005 to 4,300 (29.4% of completed questionnaires.)
  - Statistics Canada decided it could not discard this many records so unbalanced records are included in the 2006.
  - Balance edit re-introduced in 2007

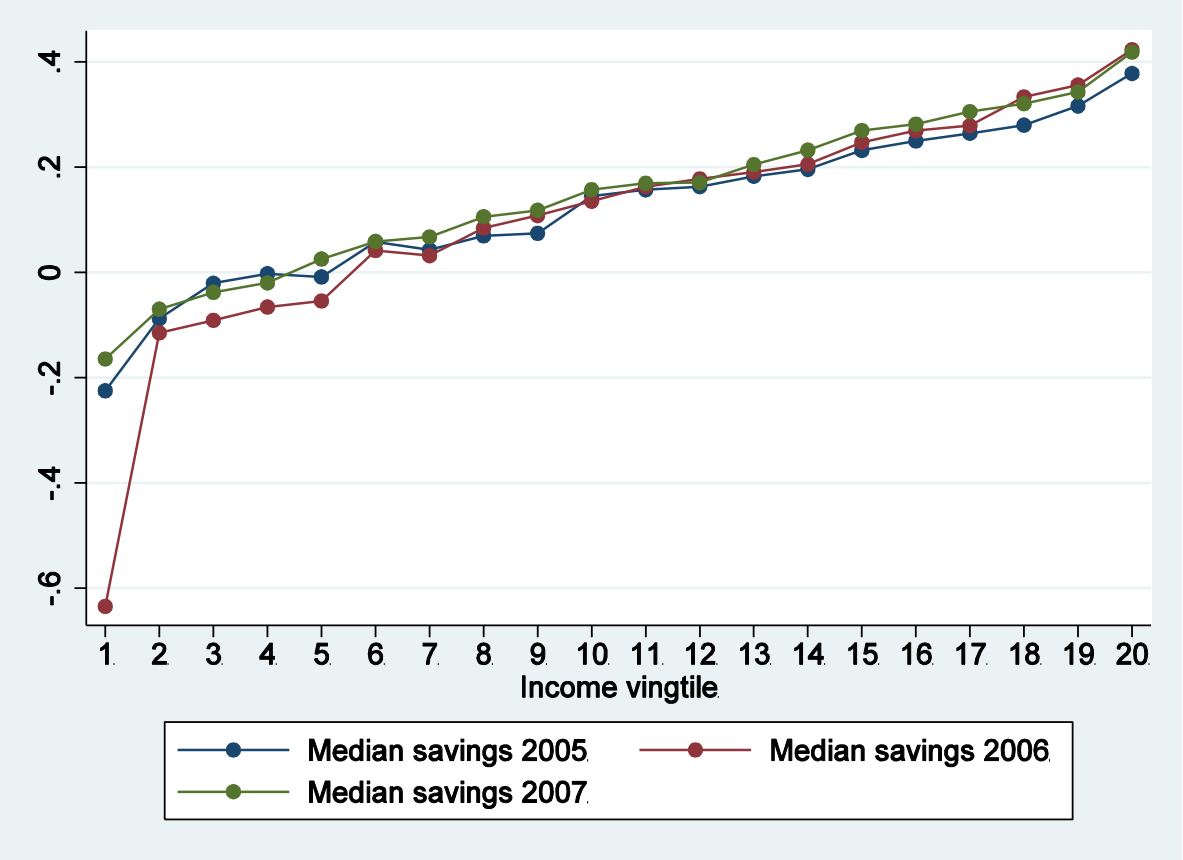
Exploration #1: The Balance Edit 'experiment'

- Our strategy here:
  - Estimate how much impact the 2006 change had on taxes, income, expenditures
  - Use characteristics exogenous to balance edit as X's: age, Hhsize, province
  - Allow quadratic trend in each of these characteristics.
  - This estimates the effect of the Balance Edit change as the deviation from the quadratic trend across the X characteristics.

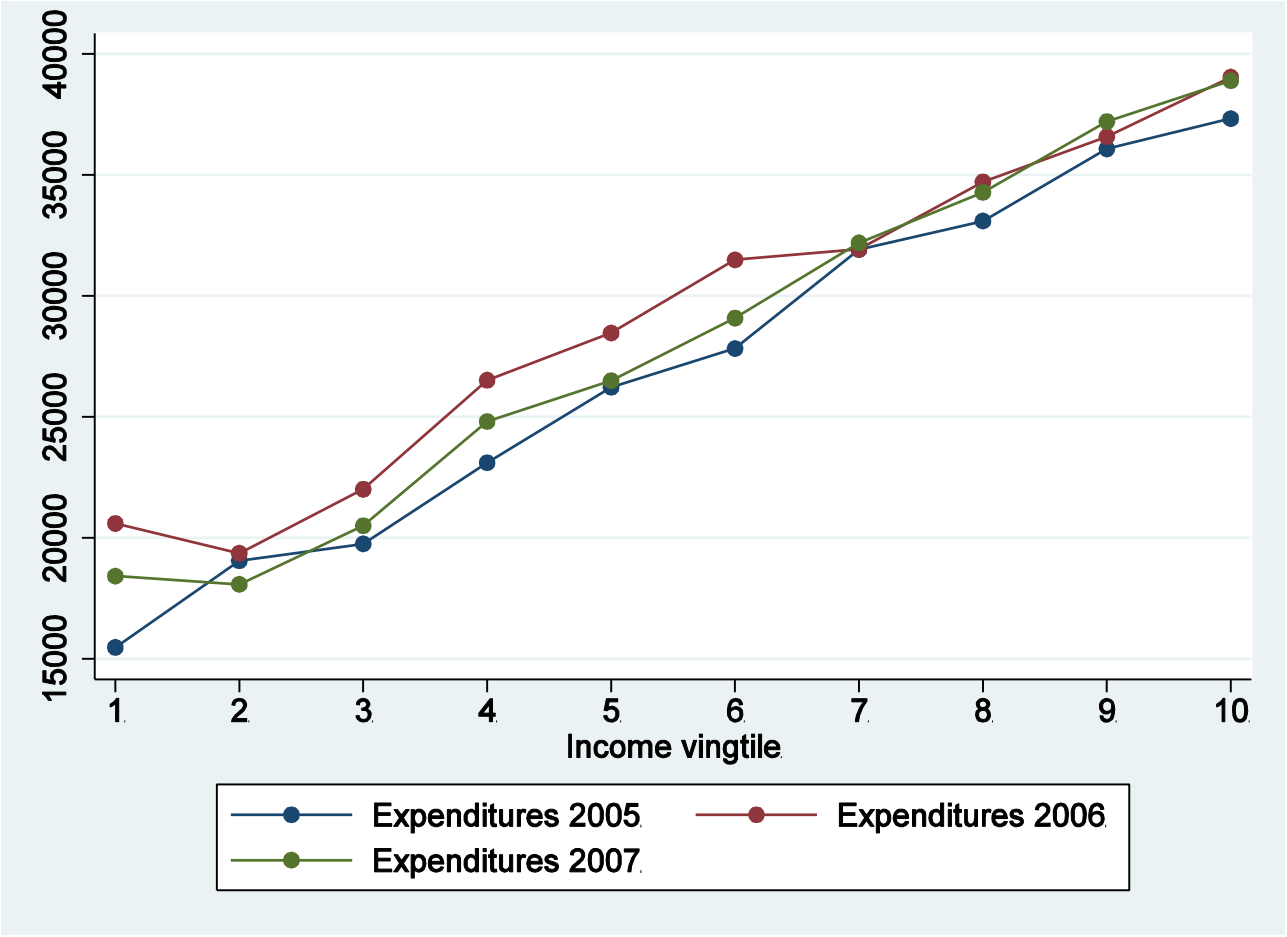
$$Y = \beta_0 + \beta_1 t + \beta_2 t^2 + \beta_3 X + \beta_4 X * t + \beta_5 X * t^2 + \beta_6 D06 + \beta_7 D06 * X + e$$

- Using these estimates, we can generate with and without Balance Edit predictions for each observation by turning D06 on and off.

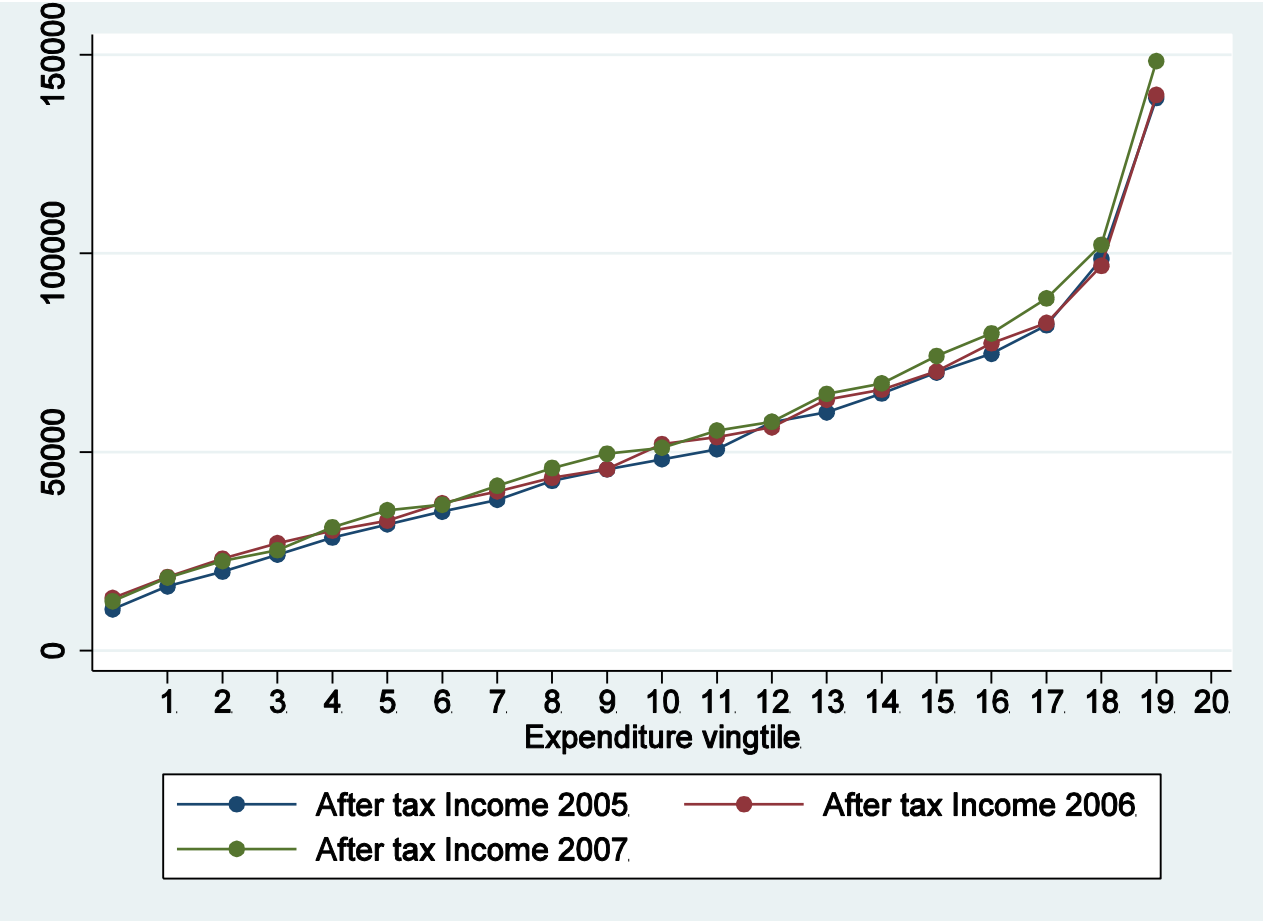
Median Savings by (actual) income vingtile



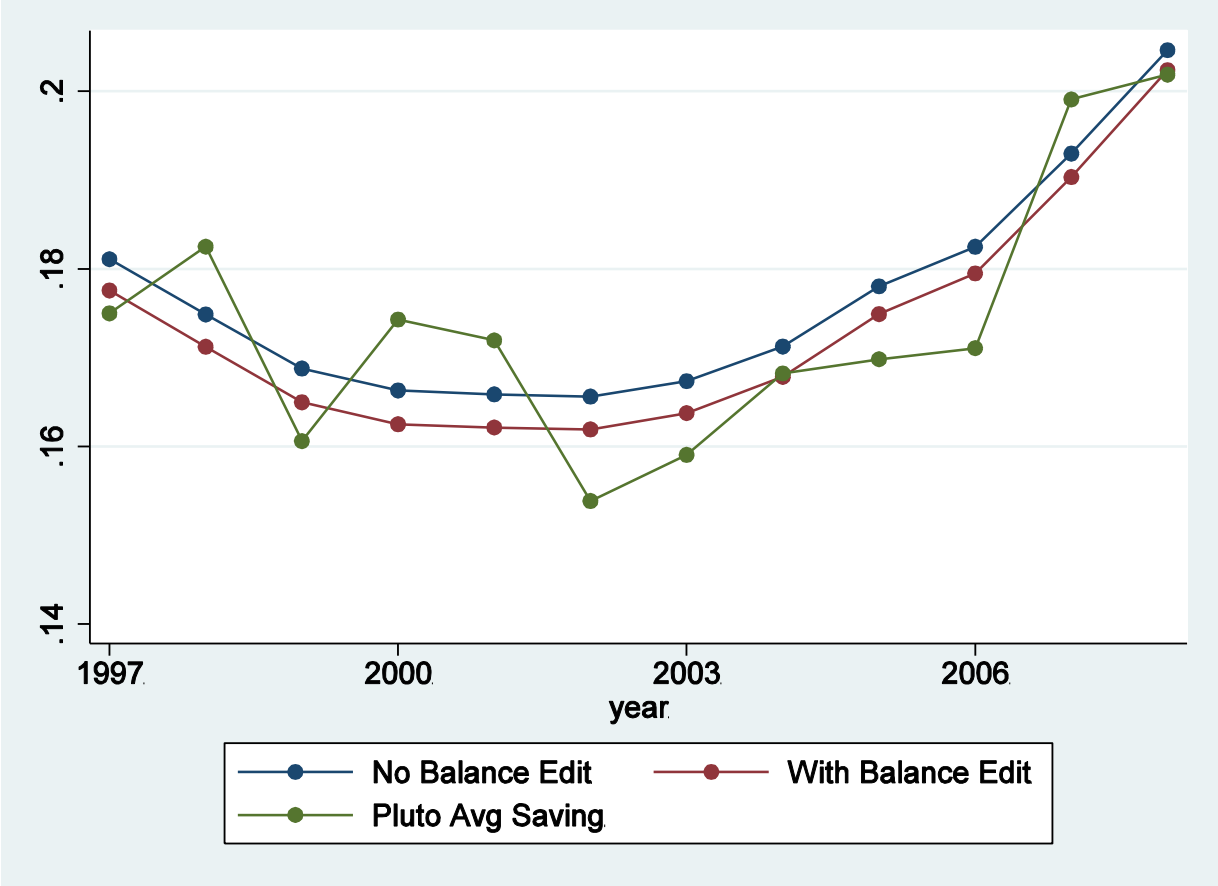
Average Expenditures by (actual) income vingtile



Income by Expenditure vingtile



Balance Edit impact on adjusted savings rate



Summary of Balance Edit

- Bunching of low income reporters at the bottom.
  - Accord with Brzozowski and Crossley (2010)
- Little apparent impact on overall savings rate
  - Guys at bottom little impact on median or plutocratic mean.
- Findings tentative

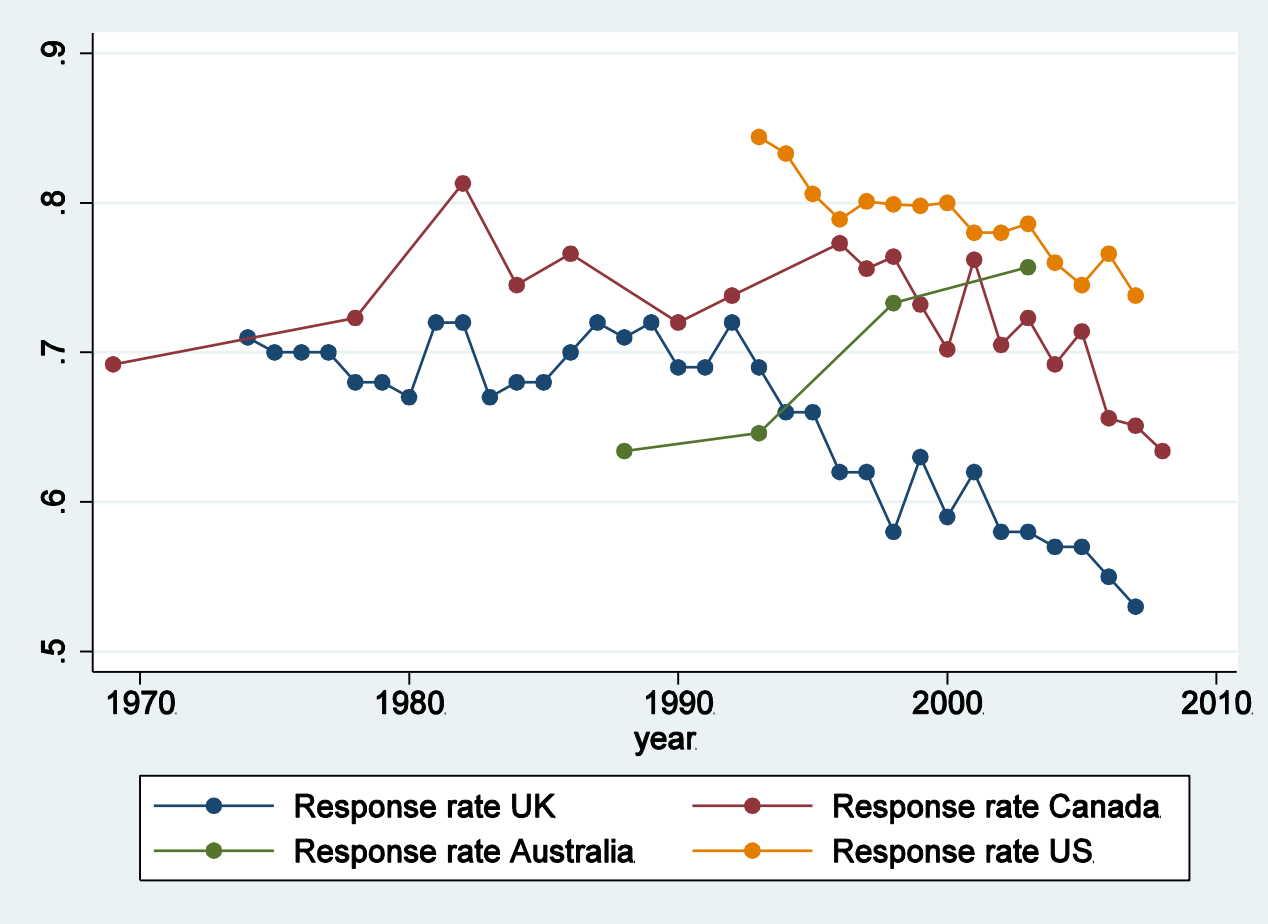
Exploration #2: coverage and response rates

- Response rates in surveys has been declining in most countries.

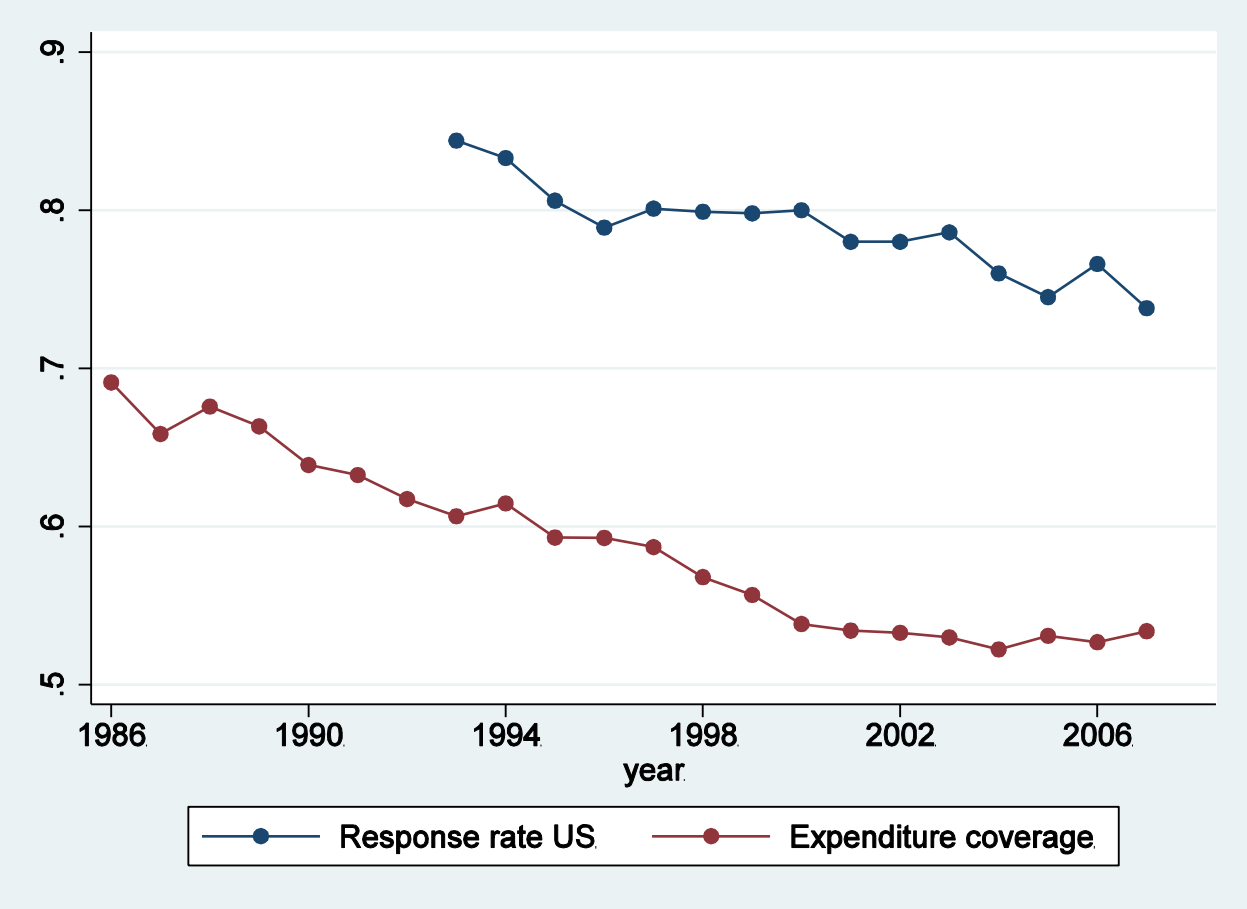
- Coverage rates (percent of PCE covered by CEX) have been declining in US.

- Does this have any impact on estimates of savings rates?
  - Recall our framework: has to change both Y and C differentially through time.

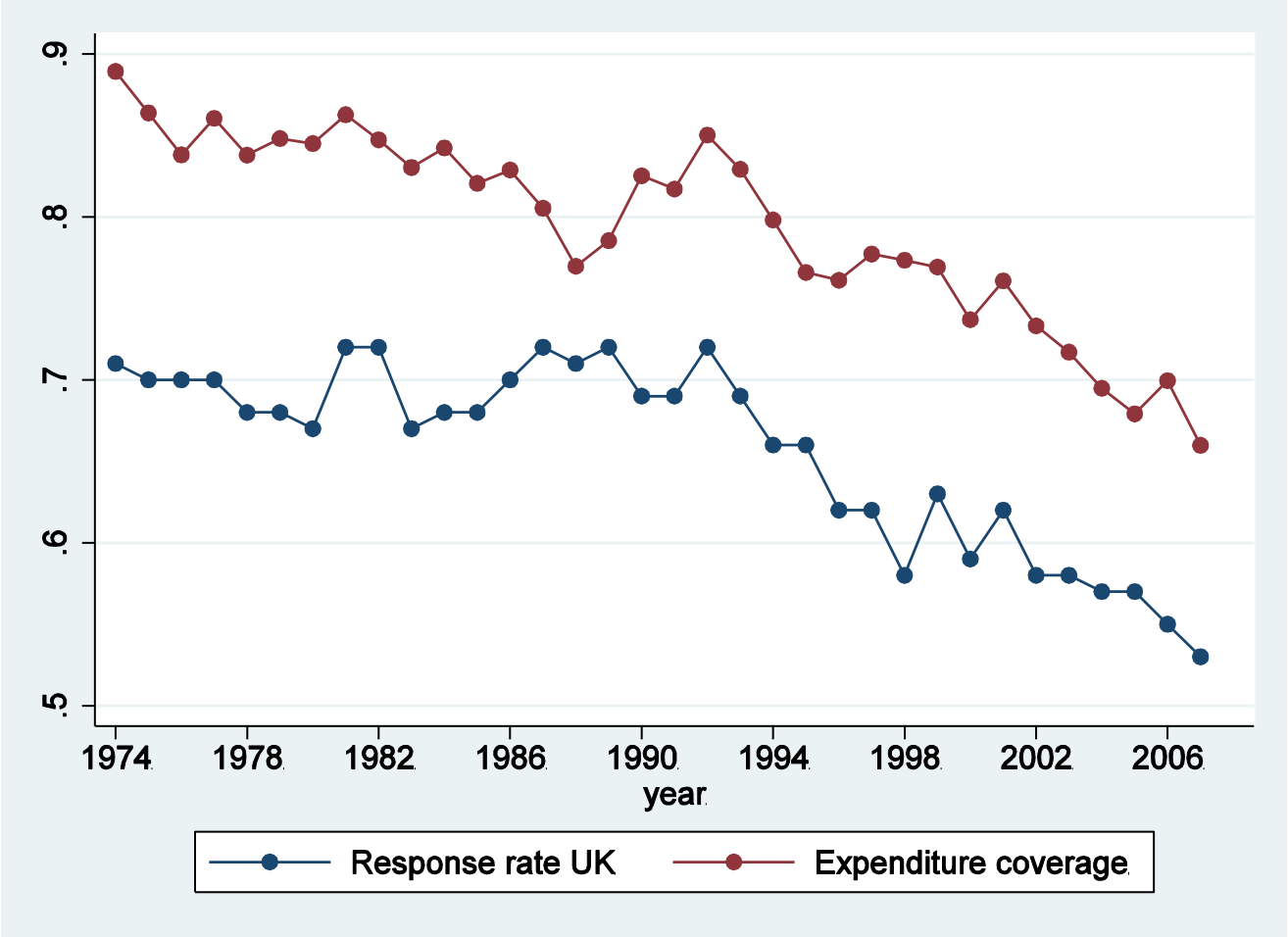
Survey response rates



Coverage United States



Coverage UK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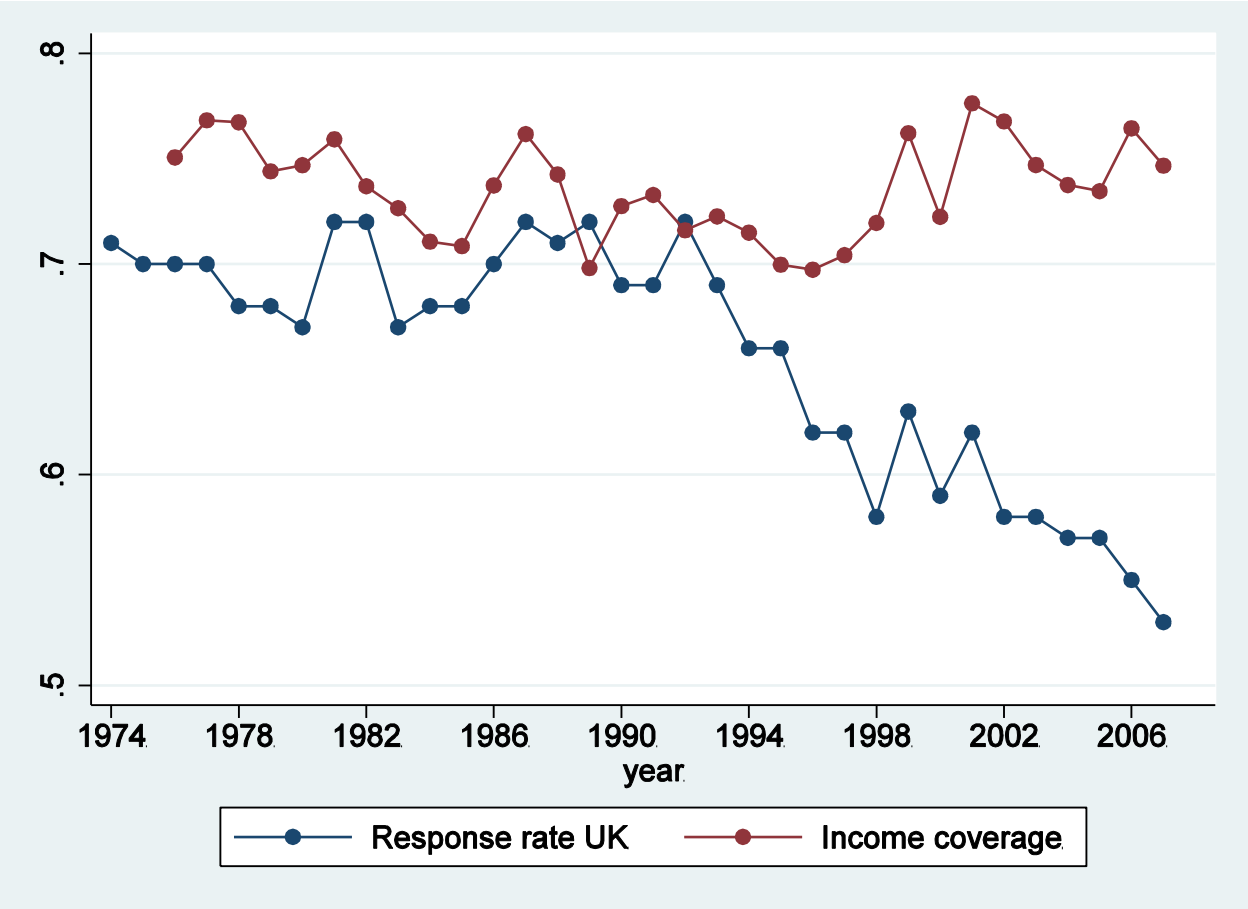
Response rate UK
Expenditure coverage

Coverage UK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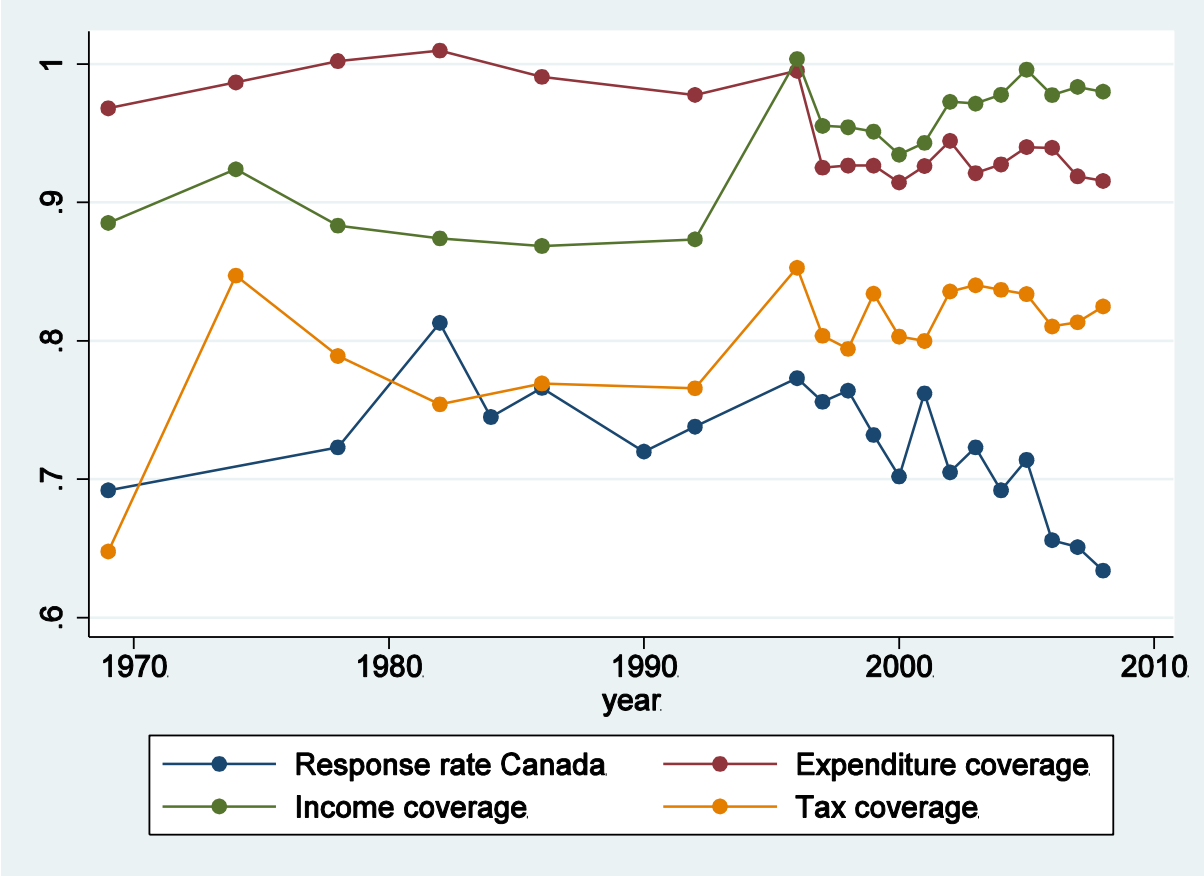
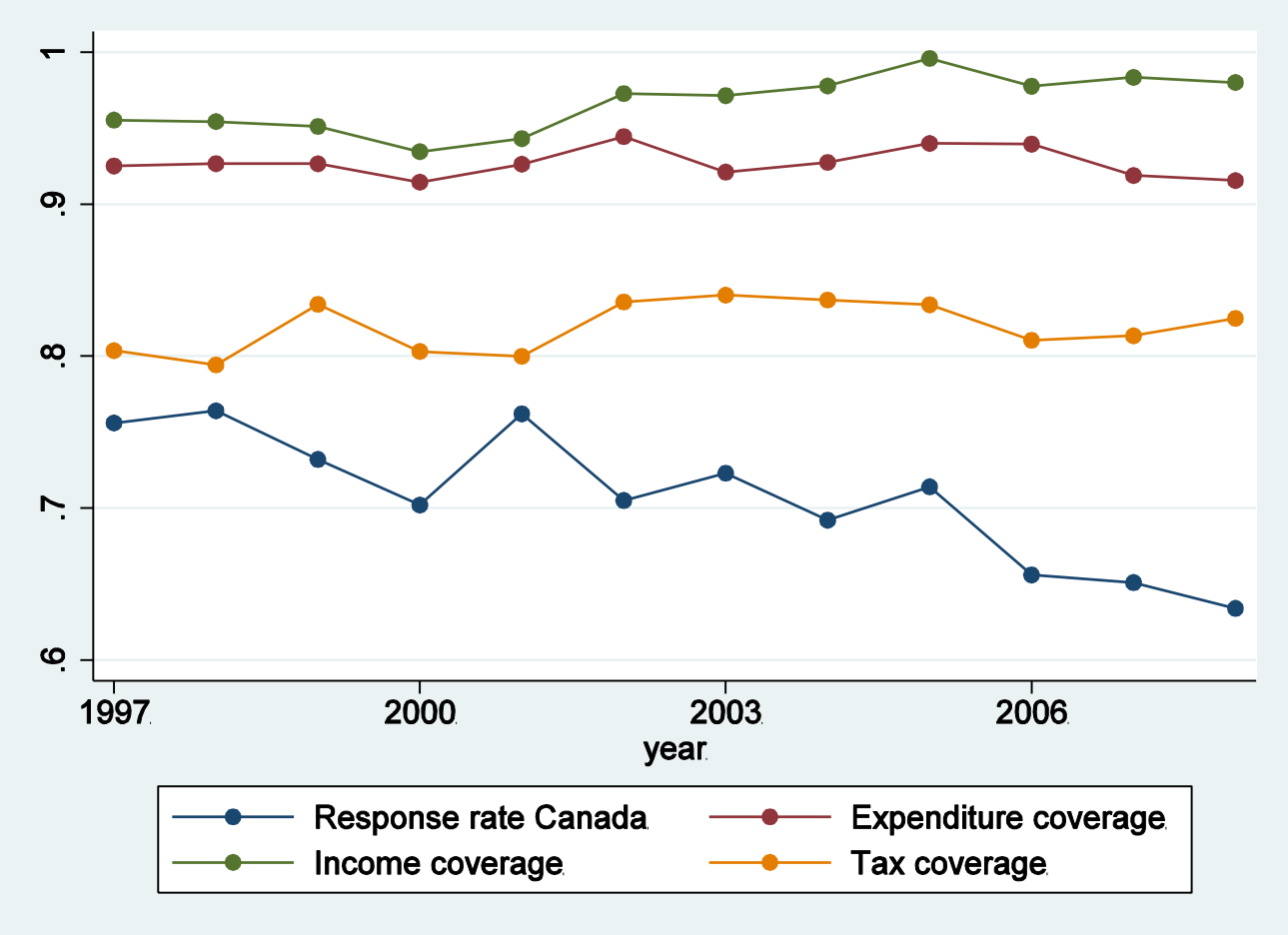
Income coverage

Coverage Canada



Coverage Canada 1997+



Summary: Response rates and coverage

- Similar decline in US, UK, and Canada—no decline in AUS.

- Expenditure coverage decline in US and UK, but not at all in Canada.
- Contrast in UK: income coverage doesn't trend down.
- Next: Look at coverage in specific categories.

Exploration #3: Coverage by category

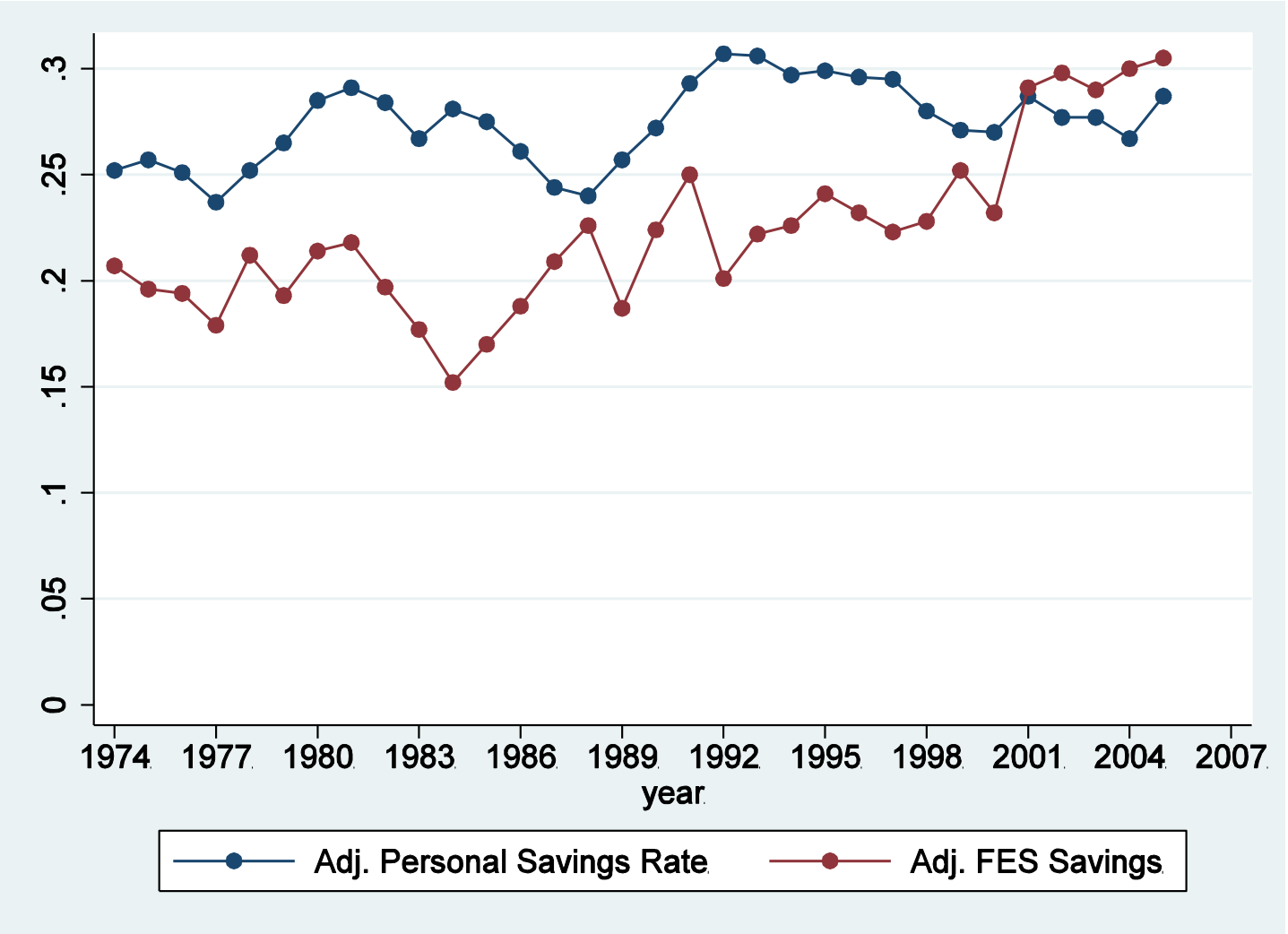
- Lots of recent attention to coverage in the US
  - Is it low? Is it trending down?

- What is going on in Canada and the UK?
  - Dig in a little more closely.

UK Adjusted Series

- Adjustments made for low coverage:
  - Housing expenditures
  - Alcohol
  - Catering

UK Adjusted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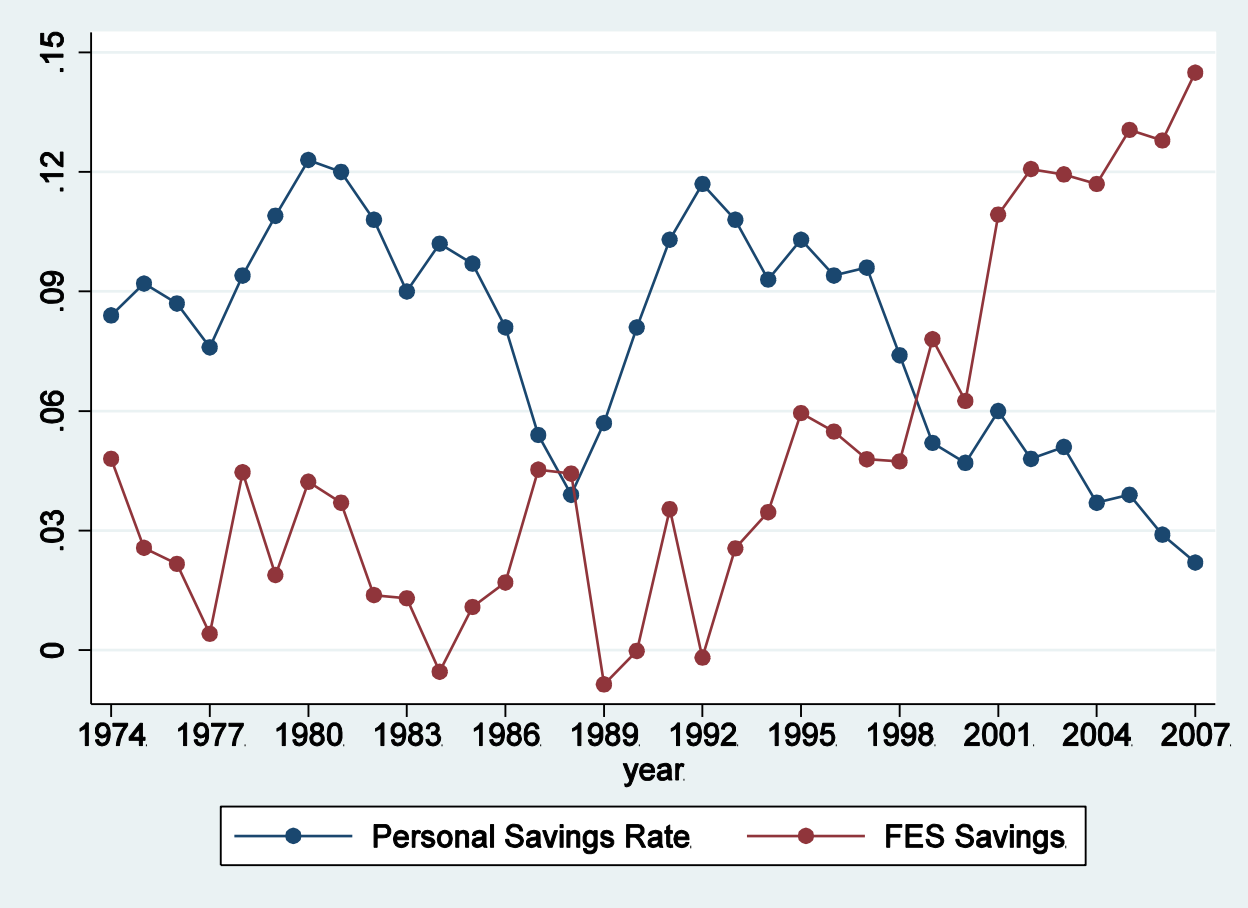
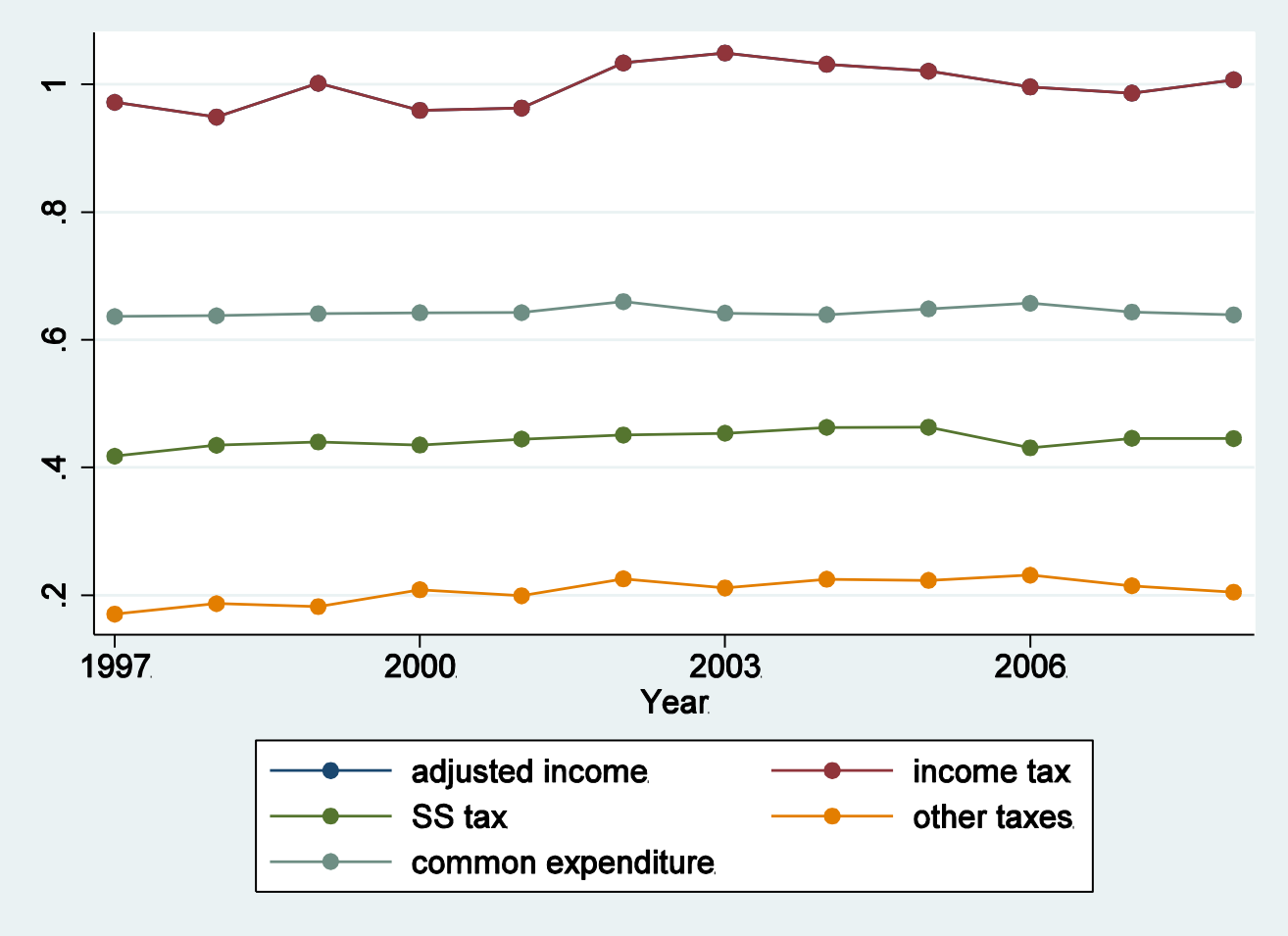
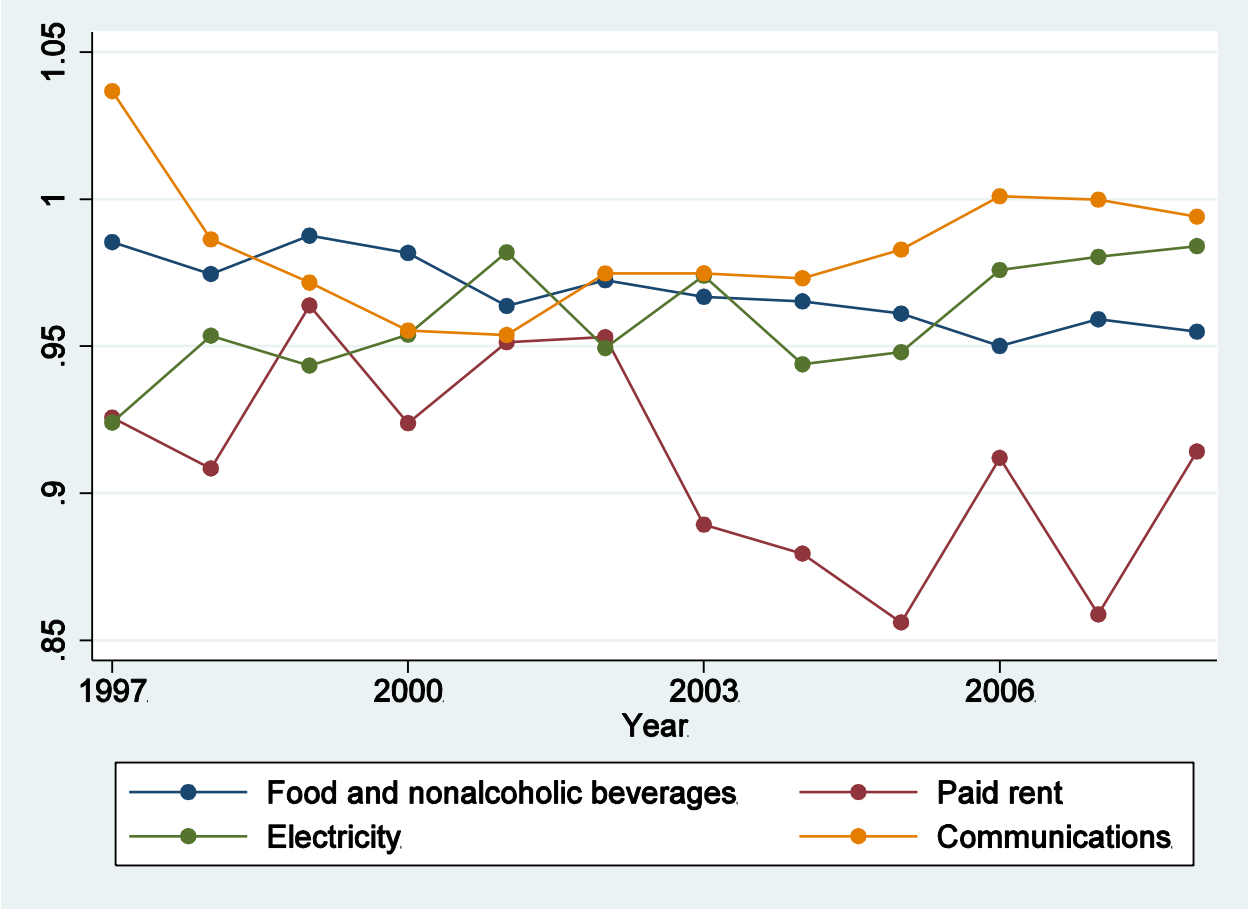
United Kingdom



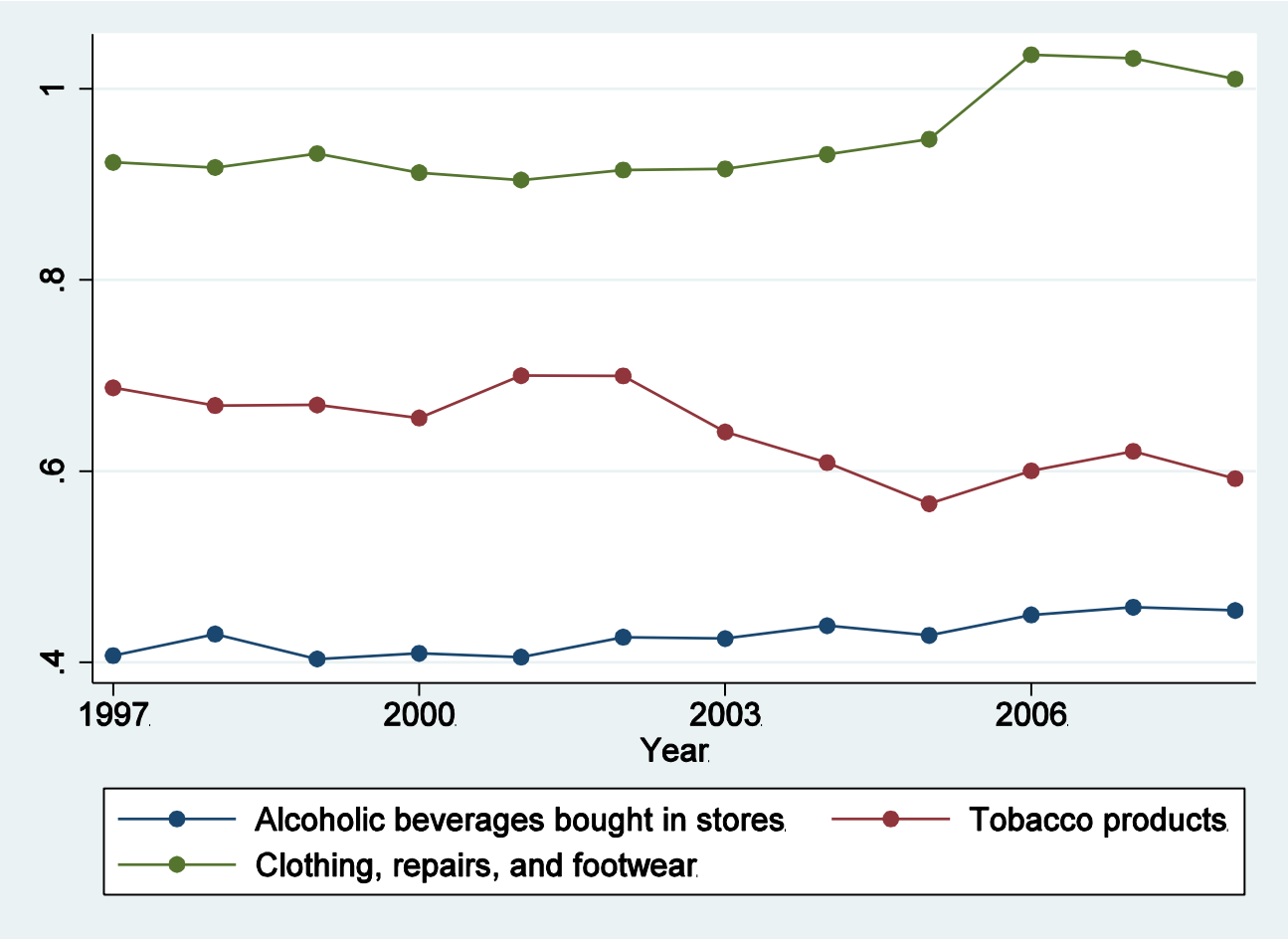
Canada: Coverage overall



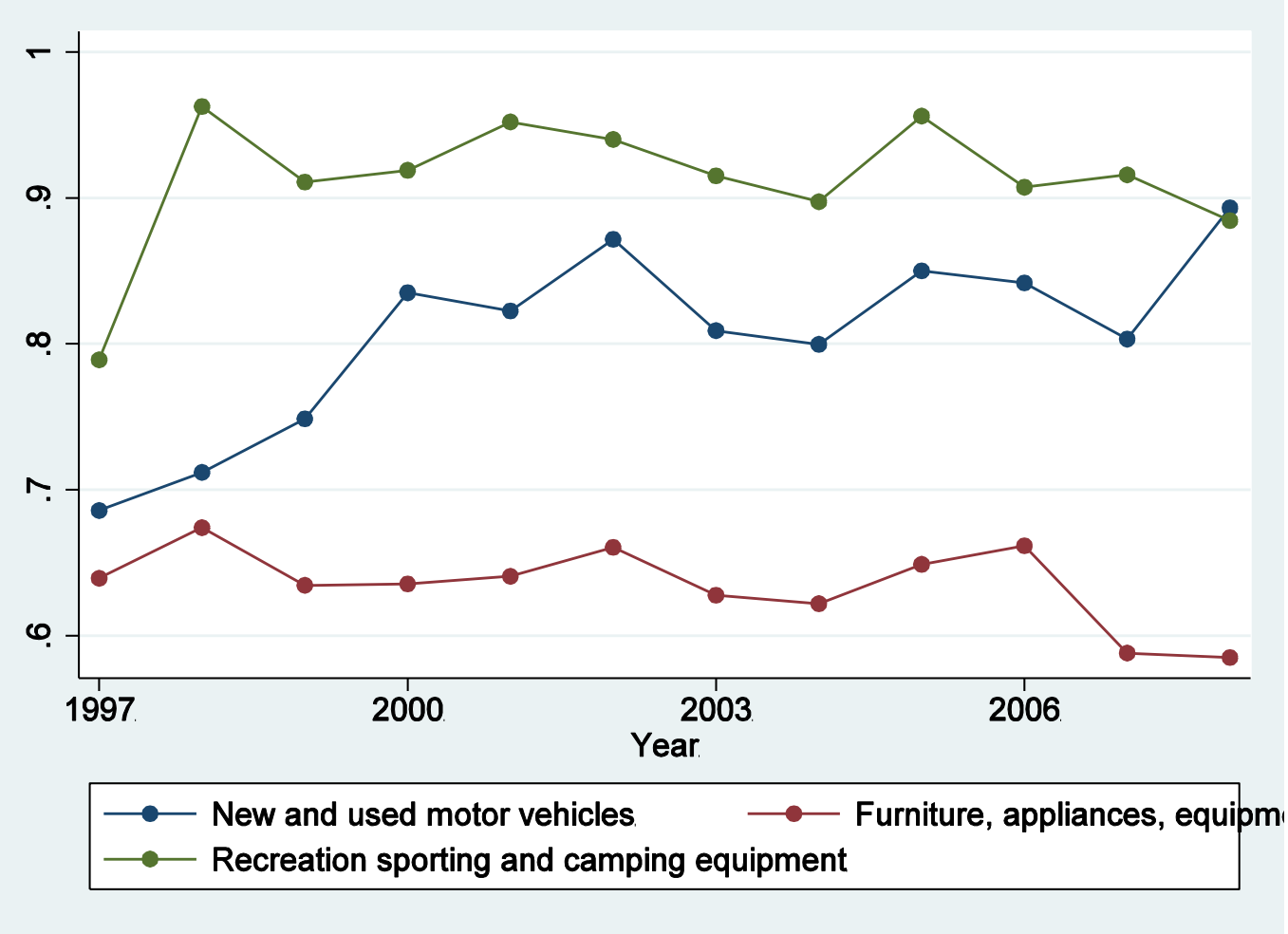
‘Core’ consumption



Irregular purchases



Durables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1997
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Year
New and used motor vehicles
Furniture, appliances, equipm
Recreation sporting and camping equipment

Summary: category analysis

- In the UK, a few categories may make a big difference to how the savings graphs look.
- For Canada, not much evidence of a decline in any category.
- Level of coverage for irregular purchases much higher in Canada.

Progress report

1. Canada looking good. Why?
    1. Balance edit doesn't seem to be a big part of the story.
    2. Declining response rates? Canada has them too.

2. UK: certain expenditure categories seem key.

3. Thoughts for directions:
    1. Look more closely at coverage by category in UK vs US.
    2. Explore weighting in Canada—does this matter.
    3. Other ideas . . .