Discrepancy in the Elasticity of Taxable Income

A litterature survey

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Outline

Motivation

Relevance

The elasticity of **labour supply** with respect to the Marginal Tax Rate (MTR)

- Important for growth in the long run and to avoid bottlenecks in the short run
- Prone to misreporting and frictions

The **Elasticity of Taxable Income (EIT)** wrt. the MTR

- Better availability and preciseness in administrative data
- Captures several behavioral responses
    - Real responses of labour supply
    - Tax avoidance, tax evasion
    - Collective agreements and career choices
- → Good measure of overall efficiency

For efficiency analysis **total revenue** should be taken into account

- Tax avoidance can lead to fiscal externalities
    - → Increase other tax bases due to income shifting towards capital or corporate income
    - → Inter-temporal substitution within the personal income base

The seminal paper

- Natural experiment: The U.S. Tax Reform Act '86
  - Reduced the marginal tax rate from 50 pct. to 28 pct. for high-earners
- Feldstein (1995) estimate the elasticity of taxable income to be greater than one
  - → U.S. was on the wrong side of the Laffer curve prior to 1986
  - → Reducing the tax rate should have *raised* the collected tax revenue
- However, Gruber and Saez (2002) estimate ETI to 0.6 for high-earners in the 80s

Discrepancy in estimates

Surveying 5 studies of the EIT, $\hat{\varepsilon}$

- A huge discrepancy is found in the estimates!
- Is a lower estimate due to better data availability and estimation methods?
- Or actual differences between tax reforms, institutional settings, and culture in the U.S. and Denmark respectively?

	$\hat{\varepsilon}$	Country
Feldstein (1995)	1.04	U.S.
Gruber & Saez (2002)	0.40-0.57	U.S.
Kleven & Schultz (2014)	0.05-0.3	DK
Chetty et al (2011)	0.00	DK
Kreiner et al (2016)	0.00-0.08	DK

Difference in differences

Feldstein (1995)

The ETI is estimated as the treatment effect around the implementation of the TRA86

$$\hat{\varepsilon} = \frac{\Delta \ln(z^H) - \Delta \ln(z^M)}{\Delta \ln(1 - \tau^H) - \Delta \ln(1 - \tau^M)} \tag{1}$$

Evaluating the the relative differences from 1985 to 1988 of

z^H : Income for high-earners

z^M : Income for medium-earners.

τ^H The MTR for high-earners.

τ^M The MTR for medium-earners.

Panel of 3.538 medium-earners and 197 high-earners $\rightarrow$ robust?

Panel are prone to bias from potential non-tax-related changes to income

1. Mean reversion
   - Individuals might only be in the high-income group initially as a results of an income shock - thus, would revert towards the mean
   - $\rightarrow$ Downward bias in the ETI estimate

2. Divergence in the income distribution
   - Non-tax-related increases in inequality
   - E.g. impacts of skill-biased technological change and globalization as observed in the U.S. in the 80s (Gruber and Saez, 2002)
   - $\rightarrow$ Upward bias in the ETI estimate

IV Panel Regresssions

Gruber and Saez (2002)

Panel with $\sim$60,000 individuals $\rightarrow$ changes in the MTR throughout 1980s

$$\underbrace{\ln\left(\frac{z_{it+k}}{z_{it}}\right)}_{\text{\%-change in income}} = \alpha_0 + \varepsilon \cdot \underbrace{\ln\left(\frac{1-\hat{\tau}_{it+k}}{1-\tau_{it}}\right)}_{\text{ETI}} + \underbrace{\sum_t \alpha_1 x_{it}}_{\text{married}} + \underbrace{\sum_t \alpha_2 YEAR_t}_{\text{year dummies}}$$

$$+ \underbrace{\alpha_3 \ln(z_{it}) + \sum_{d=1}^{10} \alpha_{4d} SPLINE_d(z_{it})}_{\text{controls for base year income}} + u_{it}, \qquad k = 1, 2, \text{ or } 3$$

(2)

Bias from **non-tax-related changes in inequality and mean reversion** is reduced by controlling for income in base year t

α_3 log-income level

α_4 10 piece spline for decile of the income distribution

Endogeneity problem: An income shock $u_{it} > 0 \rightarrow$ a mechanical rise in the MTR $\rightarrow$ corr$(\tau_{it}, u_{it}) > 0 \rightarrow$ downward bias of ε

IV: Use τ_{t+k}^h as an instrument for τ_{it+k}

τ_{t+k}^h : MTR that individual i would have paid in period $t + k$ due to changes in the tax system only $\rightarrow$ simulated using the NBER TAXSIM model.

Kleven and Schultz (2014)

- Panels of all Danish taxpayers in all **three year periods** from 1984–2005.
- Merge individual level **administrative data** containing rich information about tax types, labour market, education, and sociodemographics.
- Danish setting: income **inequality more stable** over the 22-year period than even in other Nordic countries
  $\rightarrow$ Bias from non-tax related changes to inequality and mean reversion is likely to be much less than in prior studies

Kleven and Schultz (2014)

Baseline specification: differences at time t are the differences between t and $t + 3$.

$$\Delta \ln z_{it} = \varepsilon \cdot \Delta \ln(1 - \hat{\tau}_{it}) + \eta \cdot \Delta \ln y_{it} + \Delta \gamma_t^c \boldsymbol{x}_i^c + \gamma^v \cdot \Delta \boldsymbol{x}_{it}^v + \Delta u_{it} \qquad (3)$$

Where

$\Delta \ln z_{it}$: Difference in log taxable income (labour income).

ε : Elasticity of taxable income.

Similar to specification (2) in (Gruber and Saez, 2002) with a few additions:

$\Delta \ln y_{it}$: Difference in log virtual income (the sum of non-labour incomes)
$\rightarrow$ controls for **income shifting** towards capital or corporate income

$\boldsymbol{x}_i^c$: Time-invariant individual characteristics for which the effect γ_t^c is allowed to change over time

$\Delta \boldsymbol{x}_i t^v$: Difference in time-variant individual characteristics for which the effect γ^v is constant over time

Look at all Danish wage earners during the smaller reforms of 1994-2001.

Specification similar to equation (3) (Kleven and Schultz, 2014) with a few exceptions

- Merging employer and employee data $\rightarrow$ Adds occupation FE and region FE
- Fewer controls overall though

Main contribution:

- **Clear frictions** due to the Danish labour market being highly unionized

Inter-temporal shifting

Kreiner et al. (2016)

The Danish 2010 Tax Reform

- The marginal tax rate was reduced by 7.5 pct. points
- Agreed upon as early as 1st of March 2009 and passed in parliament by late May
- → Self-employed were able to plan and employers to negotiate with their employees

Using Danish montly administrative data the short-run ETI is estimated using the panel regression:

$$\underbrace{w_{y,m,i}}_{\text{wage income}} = \beta_0 + \varepsilon \cdot \underbrace{\frac{1 - \tau_{y,i}}{1 - \tau_{2009,i}}}_{\text{ETI}} + \underbrace{\beta_1 \cdot d^{2010}_{y,i}}_{\text{2010 dummy}} + \underbrace{\beta_2 \cdot d^{T}_{i}}_{\text{treatment dummy}} + u_{y,m,i} \tag{4}$$

Evaluate the treatment group of 219,179 individuals against a control group of 109,500 individuals with weak or no incentives to shift their income due to the tax reform

- **Substantial shifting**: Estimate $\hat{\varepsilon}$ is 0.80 for D09-J10
- → Omitting N09-J10 to estimate the short-run EIT without inter-temporal shifting

Results

	$\hat{\varepsilon}$	Income group	Method	N	Period	Country
Feldstein (1995)	1.04	$\sim \$100,000$	DD	3,792	1985-1988	U.S.
Gruber & Saez (2002)	0.40	$> \$10,000$	IV Panel Reg.	$\sim$60,000	1979-1990	U.S.
—"—	0.57	$> \$100,000$	—"—	—"—	—"—	—"—
Kleven & Schultz (2014)	0.05	wage earners	IV Panel Reg.	29,668,870	1984-2005	DK
—"—	0.09	self-employed	—"—	1,646,270	—"—	—"—
—"—	0.11	all taxpayers	—"—	11,799,628	1984-1990	—"—
—"—	0.2-0.3	—"—	IV DD	$\sim$3,000,000	1986-1989	—"—
Chetty et al (2011)	0.00	wage earners	IV Panel Reg.	8,302,905	1994-2001	DK
Kreiner et al (2016)	0.08	highest quartile	Panel Reg.	328,679	2009-2010	DK
—"—	0.00	—"—	—"—	—"—	2009-2010*	—"—

Table 1: Estimated elasticity of taxable income in different studies. *excl. N09, D09 & J10.

Most other reliable studies also find the ETI to be in the range 0.12-0.40 for the U.S. (Saez et al., 2012)

Conclusion

Concluding remarks

- Dfferences-in-differences estimation is a simple way to analyze effects in the proximity of a substantial tax reform
  - But it can be difficult to completely exclude effects from non-tax-related changes to inequality and mean reversion
  - Availability of controls as well as 2SLS panel regression over a period with a variety of tax system changes can reduce these biases.
- U.S.: Most newer studies estimate a significant ETI of 0.12-0.40
- Denmark: Find modest effects → 0 when omitting intertemporal income-shifting or self-employed
- Discrepancy can partly be explained
  - By higher frictions and less options for tax avoidance in Denmark
  - But estimates have also decreased with richer better data availability allowing for more controls.

Implications for the U.S.

→ Future studies might also find estimates closer to zero for the U.S., come richer data availability

→ There might exist a revenue and efficiency loss from gaps in the U.S. tax law.

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