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MSc
Economics

Discrepancy in the Elasticity of Taxable Income

A litterature survey

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Motivation

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



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

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

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

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 → 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

→ 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)

→ Upward bias in the ETI estimate

IV Panel Regressions

Panel with ~60,000 individuals → changes in the MTR throughout 1980s

$$\underbrace{\ln\left(\frac{z_{it+k}}{z_{it}}\right)}_{\% \text{-change in income}} = \alpha_0 + \underbrace{\varepsilon \cdot \ln\left(\frac{1 - \hat{\tau}_{it+k}}{1 - \tau_{it}}\right)}_{\text{ETI}} + \underbrace{\sum_t \alpha_1 x_{it}}_{\text{married}} + \underbrace{\sum_t \alpha_2 \text{YEAR}_t}_{\text{year dummies}} \quad (2)$$

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

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 $\rightarrow \text{corr}(\tau_{it}, u_{it}) > 0 \rightarrow$ 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.

- 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
 - Bias from non-tax related changes to inequality and mean reversion is likely to be much less than in prior studies

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

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

Similar to equation (2) (Gruber and Saez, 2002) with a few additions

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

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

$\Delta \log y_{it}$: Difference in log virtual income (the sum of non-labour incomes)

→ controls for **income shifting** towards capital or corporate income

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 → 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

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 monthly administrative data the short-run ETI is estimated using the panel regression:

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

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 ETI without inter-temporal shifting

Results

| | $\hat{\epsilon}$ | Income group | Method | N | Period | Country |
|-------------------------|------------------|------------------|---------------|------------|------------|---------|
| Feldstein (1995) | 1.04 | ~ \$100,000 | DD | 3,792 | 1985-1988 | U.S. |
| Gruber & Saez (2002) | 0.40 | > \$10,000 | IV Panel Reg. | ~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 | ~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

- Differences-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 $\rightarrow 0$ 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.

- \rightarrow Future studies might also find estimates closer to zero for the U.S., come richer data availability
- \rightarrow There might exist a revenue and efficiency loss from gaps in the U.S. tax law.

References

References



Chetty, Raj et al. (2011). “Adjustment costs, firm responses, and micro vs. macro labor supply elasticities: Evidence from Danish tax records”. In: The quarterly journal of economics 126.2, pp. 749–804.



Feldstein, Martin (1995). “The effect of marginal tax rates on taxable income: a panel study of the 1986 Tax Reform Act”. In: Journal of Political Economy 103.3, pp. 551–572.



Gruber, Jon and Emmanuel Saez (2002). “The elasticity of taxable income: evidence and implications”. In: Journal of public Economics 84.1, pp. 1–32.



Kleven, Henrik Jacobsen and Esben Anton Schultz (2014). “Estimating taxable income responses using Danish tax reforms”. In: American Economic Journal: Economic Policy 6.4, pp. 271–301.



Kreiner, Claus Thustrup, Søren Leth-Petersen, and Peer Ebbesen Skov (2016). “Tax reforms and intertemporal shifting of wage income: Evidence from Danish monthly payroll records”. In: American Economic Journal: Economic Policy 8.3, pp. 233–57.



Saez, Emmanuel, Joel Slemrod, and Seth H Giertz (2012). “The elasticity of taxable income with respect to marginal tax rates: A critical review”. In: Journal of economic literature 50.1, pp. 3–50.