Predicting effects of tax policy by external evidence of behavioral effects

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1. Introduction

Introduction

- Standard tax-benefit microsimulation models are non-behavioral
  - Compute revenue and distributional effects under the assumption that people's decisions are not changed by the policy
- A common method to add behavioral labor supply effects to static microsimulation models
  - Discrete choice structural models
- An alternative approach is to use "external evidence" of behavioral effects from the literature, e.g. quasi-experimental evidence
- Provide ex-ante information about expected effects on labor supply, revenue and distributional effects

Predicting effects of tax policy by external evidence

- Feeding evidence from the literature into tax-benefit model has been done before
  - Thoresen, T. O. (2004). Reduced Tax Progressivity in Norway in the Nineties. The Effect from Tax Changes. International Tax and Public Finance, 11(4), 487–506
  - Thoresen, T. O., E. E. Bø, E. Fjærli, and E. Halvorsen (2012). A Suggestion for Evaluating the Redistributional Effects of Tax Changes: With an Application to the 2006 Norwegian Tax Reform. Public Finance Review, 40(3), 303–338
  - Ollonqvist, Tervola, Pirttilä, Thoresen (2023). Accounting for behavioral effects in microsimulation: A reduced form approach. Manuscript.
- In the present paper we explore this approach
  - Addressing effects on the extensive margin and intensive margin of labor supply

2. Behavioral response estimates

Behavioral adjustments - intensive margin

Elasticity of taxable income (ε):

$$\varepsilon = \frac{\Delta y/y}{\Delta(1-MTR)/(1-MTR)}$$

Adjustment of income:

$$\Delta y_i = \varepsilon \frac{(1-MTR_{1i}) - (1-MTR_{0i})}{(1-MTR_{0i})} y_{0i}$$

Behavioral adjustments - extensive margin

Extensive margin elasticity (η):

$$\eta = \frac{\delta P/P}{\delta(1-PTR)/(1-PTR)}$$

Adjustment of number of labor market participants:

$$\Delta FR = \eta \frac{(1-PTR_1)-(1-PTR_0)}{(1-PTR_0)} FR_0.$$

Intensive margin elasticity estimates (ε)

Table 1: A selection of ETI estimates of the literature: Studies of the Nordic countries and average US and Scandinavia

Study	Country	Income concept	Estimate
US studies (Neisser, 2021)	US average	Broad income	0.49
Scand. studies (Neisser, 2021)	Scand. aver.	Broad income	0.18
Kleven and Schultz (2014)	Denmark	Taxable wage-income	0.05
Kleven and Schultz (2014)	Denmark	Taxable self-empl. income	0.1
Matikka (2018)	Finland	Taxable income	0.21
Aarbu and Thoresen (2001)	Norway	Taxable income	0.2
Thoresen and Vattø (2015)	Norway	Taxable labor income	0.04–0.06
Vattø (2020)	Norway	Taxable labor income	0.09–0.15
Berg and Thoresen (2020)	Norway	Taxable self-empl. income	0.17
Hansson (2007)	Sweden	Taxable earned income	0.4–0.5
Holmlund and Söderström (2011)	Sweden	Taxable male labor income	0.1–0.3

Notes: Broad income refers to a before deduction income concept. The estimation technique applied in Holmlund and Söderström (2011) is somewhat different from the others, as they estimate a dynamic model.

Extensive margin elasticity estimates (η)

- Chetty et al (2013) summarizes 0.13-0.43
- Discussion on to which extent the responsiveness on the extensive margin is larger than on the intensive margin
  - Contrary to consensus, Kleven (2023) finds that the EITC expansions (in the US) basically have had no clear and significant effects on employment
- Fewer quasi-experimental extensive margin elasticity estimates for Scandinavia
  - Bastani, Moberg and Selin (2021) find $\eta = 0.13$

3. The external evidence approach

The external evidence approach

1. Pick relevant responses estimates (elasticities) from the empirical literature
2. Simulate MTR and PTR, before and after the prospective policy change, using a (non-behavioral) tax-benefit microsimulation model
3. Adjust affected individuals pre-tax income to account for the expected behavioral adjustments. Measure revenue effects and distributional effects.

4. Illustration of the approach

The tax policy change and assumptions

- Introduction of a fifth step in the step-tax in Norway in 2022
  - Top marginal tax rate increased from 46.4 to 47.4 for income over NOK 2 million (EUR 200,000)
- Intensive margin elasticity
  - $\varepsilon = 0.2$
- Extensive margin elasticity
  - $\eta = 0.1$

Simulate MTR and PTR in a static microsimulation model

- Marginal tax rates (MTR)
  - Increase observed earnings marginally and simulate the change in taxes
- Participation tax rates (PTR)
  - Assumptions on income in the counterfactual state of participation/non-participation

Effects on tax revenue

Table. Tax revenue effects of introducing a fifth step in the step-tax, million NOK

	Total tax revenue	Diff. to benchmark
Benchmark: 2023 tax-rules without 5th step	578,134	-
2023 tax-rules		
Mechanical effect	578,402	268
Intensive margin behavioral effect		-106
Extensive margin behavioral effect		-6
Mechanical and behavioral effects	578,290	156
Behavioral counteracting effect ratio		0.42

Notes: Simulations by Norwegian tax-benefit model LOTTE-Skatt, data for 2019 projected to 2023. Behavioral effects are accounted for by an ETI estimate of 0.2 at the intensive margin and 0.1 at the extensive margin.

5. Comparison to a structural labor supply model

Comparison to a structural approach

- Individuals make choice from a set of finite number of working hours, such as

$$h \in \langle 0-5, 5-10, 10-15, ..., 45-50, 50+ \rangle$$

- Random utility set-up

$$U(C,h) = \nu(C,h) + \varepsilon(C,h)$$

- Get a simple expression of the probability for the individual choosing working hours h

$$P(h) = \frac{\exp \nu\left(f\left(hW,I\right),h\right)}{\exp \nu\left(f\left(0,I\right),0\right) + \sum_{h \in D} \exp \nu\left(f\left(hW,I\right),h\right)}$$

- Estimate the multinomial logit model on cross-sectional data of the Norwegian Labor force survey
- Include individuals in age group 25-62, exclude self-employed, disabled, unemployed, students

Wage elasticities

Table. Simulated labour supply elasticities with respect to the wage rate for individuals in couples and singles, 2014.

	Female own wage	Male own wage	Female cross wage	Male cross wage
Individuals in couple				
Participation (ext. margin)	0.135	-	-0.048	-
Hours cond. on working (int. margin)	0.197	0.095	-0.043	-0.009
Total elasticity	0.332	0.095	-0.091	-0.009
Single individuals				
Participation (ext. margin)	0.012	-		
Hours cond. on working (int. margin)	0.057	0.009		
Total elasticity	0.069	0.009		

Notes: The elasticities reflect the simulated percentage change (average across individuals) in the probability of participation (extensive margin) and working hours conditional on working (intensive margin) when the hourly wage rate is increased by one percent for all wage earners.

Effects on tax revenue using the structural approach

Table. Tax revenue effects of introducing a fifth step in the step-tax, million NOK. Results from structural labor supply model simulation (LOTTE-Arbeid)

Non-behavioral revenue change	247
Effects on revenue from changed behavior	-74
Behavioral counteracting effect ratio	0.3

Notes: Simulations by the structural labor supply model LOTTE-Arbeid, data for 2019 projected to 2023. Difference between simulations, 2023 tax-rules vs 2023 tax-rules without the 5th step (benchmark).

Differences to the "external evidence" approach

- Estimation technique
- Response heterogeneity
- Population coverage
- Margins of response - working hours vs taxable income

6. Summary and remaining work

Summary

- We explore an approach to incorporate behavioral responses in microsimulation models using external evidence of elasticity estimates
- The external evidence approach serve as a practical alternative to a fully specified structural labor supply model

Remaining work

- Illustrate the approach by an additional tax change example - a tax deduction for low-earnings, which is expected to primarily affect responses at the extensive margin of labor supply
- Improve the "external evidence" approach at the extensive margin
  - Predict counterfactual labor marked state based on individual characteristics
  - Compute participation tax rates at the individual level
  - Measure (weighted) average effect of expected switchers on tax revenues and changes in disposable income