



Validation of the discrete choice labor supply model by methods of the new tax responsiveness literature☆



Thor O. Thoresen^{a,b}, Trine E. Vattø^{a,*}

^a Statistics Norway

^b Oslo Fiscal Studies (Department of Economics, University of Oslo), Norway, CESifo (Munich), Germany

HIGHLIGHTS

- We conduct an out-of-sample validation of a discrete choice labor supply model.
- Panel data methods of the NTR/ETI literature are used to validate the model.
- We analyze responses in both working hours and earned income.
- The simulation results are converted into comparable net-of-tax rate estimates.
- The labor supply model performs well according to this validation exercise.

ARTICLE INFO

Article history:

Received 20 March 2014

Received in revised form 11 August 2015

Accepted 3 September 2015

Available online 12 September 2015

Keywords:

Model validation

Tax response

Discrete choice labor supply model

Elasticity of earned income

ABSTRACT

The static structural discrete choice labor supply model continues to be a workhorse in the process of policy-making, extensively used by policy-makers to predict labor supply effects of changes in the personal income tax system. A widely used alternative to obtain estimates of individual tax responsiveness is to exploit the diversity of tax treatment generated by a tax reform to recover tax induced outcome differences in data. Response estimates obtained from analysis of tax reforms are less useful for describing effects of prospective policies, but represent an underexploited source of information for out-of-sample validation of labor supply models. The present study describes how estimates of responses in working hours and income, generated from a tax reform, can be used to validate a discrete choice labor supply model; thus, bringing together and providing guidance to how results of two main avenues of obtaining estimates of tax responsiveness can be compared and interpreted. We find that the discrete choice model used by Norwegian policy-makers performs well as measured by this type of validation.

© 2015 Elsevier B.V. All rights reserved.

1. Introduction

Some institutions, such as the Joint Committee on Taxation (U.S.), the Institute for Fiscal Studies (U.K.), and the Research Department of Statistics Norway, are expected to deliver empirical estimates of labor supply effects to the decision-makers in their respective countries. The

application of certain modeling tools is often a prerequisite for this, and the structural static labor supply model represents a practical alternative for predicting effects of tax changes on the labor market behavior of income earners. Based on cross-sectional observations of households' and individuals' consumption and connections to the labor market (typically working hours), labor supply models can be estimated and then used in the policy-making process for simulations of short term labor market effects of prospective changes in the tax system.

In the category of structural labor supply modeling approaches, the discrete choice model of labor supply based on the random utility modeling approach (van Soest, 1995) stands out, as it has gained widespread popularity among public finance practitioners (Creedy and Kalb, 2005). For example, Norwegian decision-makers have access to a discrete choice labor supply model through the model system LOTTE (Aasness et al., 2007).

However, concerns have been raised about the ability of structural models to generate robust predictions about the effects of policy changes, see for example LaLonde (1986) and Imbens (2010). As models may be too stylized or may suffer from misspecification, predictions of effects

☆ Financial support from the Research Council of Norway (# 187 405) is gratefully acknowledged. We have received valuable comments on earlier versions of the paper from Karl Ove Aarbu, John Dagsvik, Frank Fossen, Zhiyang Jia, Jukka Pirtillä, Arvid Raknerud, Victoria Sparrman, Viktor Steiner and seminar participants at Wirtschaftspolitisches Seminar in Berlin, Skatteforum (Moss, June, 2011), the 67th IIPF-conference (Ann Arbor, August, 2012), Workshop on Recent Advances in Labor Supply Modeling (Dublin, May, 2012), Workshop in Public Economics (Uppsala, June, 2012), and the Melbourne Institute Seminar Series (December, 2013). We would also like to thank the Editor and two anonymous referees for their helpful comments and stimulating criticism of an earlier draft.

* Corresponding author.

E-mail addresses: tot@ssb.no (T.O. Thoresen), tev@ssb.no (T.E. Vattø).

of counterfactual policy alternatives are not always trustworthy. The use of predictions from structural models as input to the policy-making process is therefore disputed, and the policy analyst may resort to providing alternative and less detailed information about tax responsiveness, such as tax response estimates obtained from studies using quasi-experimental econometric designs. In the present study we argue that instead of dismissing the structural labor supply model approach as a tool for policy-making completely, more effort should be put into qualifying models through validation. In this perspective, results from experiments serve as useful information sources for validation of prediction models (Blundell, 2006; Keane, 2010a).

Models should be assessed with respect to realism and reasonability of assumptions. As for model performance, the researcher usually does not have much information apart from goodness-of-fit measures. Such evidence is valuable, but insufficient, and a key test of model validity is to examine how well the model predicts out-of-sample labor supply behavior.

There are several alternatives for out-of-sample validations of the discrete choice model. Mechanical use of experimental sources for validation is problematic, as they are informative about the combined impact of the policy change in question and other effects, such as contemporaneous changes in the tax and benefit and welfare systems and the business cycle. In this perspective, the so-called elasticity of taxable income approach (the ETI approach), or interchangeably labeled the new tax responsiveness literature (the NTR approach), represents a promising alternative for use in external validations, as it denotes a well-established procedure to rinse out the effects of taxes. Studies of the large and growing ETI/NTR literature exploit that tax reforms generate net-of-tax rate changes along the income scale, often resulting in substantial tax changes for some tax-payers, whereas others are more or less unaffected. Taxable income is used as the main measure of outcome in this literature, as it in principle captures all the public policy relevant behavioral responses of a reform (hours worked, effort, tax avoidance and evasion, change of job, etc). The review of this literature in Saez et al. (2012) clearly reveals that this has been a fertile field of research in recent decades, even though there are well-known methodological complications involved.

Here we suggest using the ETI/NTR approach to validate the discrete choice labor supply model. However, in the validation we shall use estimates of responses in working hours and earned income, and not responses in total taxable income. As for the terminology, the use of the acronym ETI for “elasticity of taxable income approach” may therefore be less suitable in the present context. To maintain that we use exactly the same techniques as studies under the ETI label, but to avoid the potential distraction that comes from the reference to “taxable income”, we will employ the other term which we see used for the labeling of this type of study: the NTR approach, an expression introduced by Goolsbee (1999).

Thus, results of probably the two most used sources of information on tax responsiveness are brought together in the present study: simulation results from the discrete choice labor supply model, estimated on a single cross-section of data, and estimates obtained from analysis of panel data, where tax reforms are used for identification (hereafter referred to as the NTR approach). Estimates from “natural experiments” have limited value in a prediction context (less external validity), because they rely on a particular reform for identification, and parameters are therefore not usually policy invariant, but the NTR approach represents a powerful and underexploited tool in a validation context. Of course, this exercise cannot prove the model “correct”, but is helpful in detecting misspecified models.

The main contribution of the present study is to show how results of the two techniques can be understood and utilized in a validation context. We use a large dataset for Norwegian wage earners, based on administrative registers, and exploit the tax changes due to the Norwegian tax reform of 2006 to obtain two sets of tax response estimates for wage earners (separately for single females, single males, and females and males in couples): one set of NTR elasticities for working hours and one set for earned income. Then the discrete choice labor supply model is estimated

on the same data, and results from model simulations of the 2006-reform are recalculated into NTR elasticities for working hours. The description of the conversion of results from the random utility discrete choice model into NTR results is a key contribution of the paper.

Another main contribution of the paper comes from having access to panel data information for both working hours and earned income, which means that we are able to elaborate upon key characteristics of the discrete choice model in a validation perspective. The conventional discrete choice model (van Soest, 1995) implies that the individual specific wage is kept fixed in the transition from pre-reform to post-reform tax schedules. In contrast, in the standard NTR approach, which focuses on responses in income, one may also see responses in wages (in addition to changes in hours of work), as individuals may react to a tax change by finding a new job, take on other tasks in the present job, or change behavior in the wage bargaining, etc., see Feldstein (1995). Thus, if we observe substantially larger NTR responses in earned income than in working hours, that may call for other modeling tools. One could think of allowing for specific relationships between working hours and wage rates in the model simulations, but we are not aware of any simulation model, with a similar design as ours, that allows for individual effort responses or includes a specific tied relationship between working hours and wage rates in the simulations.¹

Moreover, and related to the question of different margins of tax response, a discussion of the relationship between responses in earnings and working hours is also useful for future validation practice, in that it provides guidance on the use of income information alone in a validation exercise like the present one. Large register-based datasets on income are now commonly more accessible for the analyst than data on hours of work in the Nordic countries and in several other countries (UN, 2007).

The paper is organized as follows. In Section 2 we present the two methodological approaches for obtaining tax response estimates, whereas Section 3 presents some studies of the validation literature. Section 4 describes the data sources we have utilized in this study, gives a brief overview over the tax reform of 2006, and shows preliminary data descriptions, given the main characteristics of the reform and their expected implications for income patterns. In Section 5 we present the results of the validation exercise, and Section 6 concludes the paper.

2. Two approaches to obtain estimates of short term tax responsiveness

A whole range of different tax response estimates can be found in the labor supply literature, reflecting inter alia different theoretical models and methodological approaches. In the present analysis, we discuss evidence from two well-known static approaches to produce short term measures of tax responsiveness: tax simulation based on a structural discrete choice labor supply model, and reduced-form estimation exploiting differential changes in tax treatment following from tax reforms. Given that estimation of structural labor supply models often involves severe econometric challenges,² see reviews in Blundell and

¹ There are studies accounting for interrelationships between wages and preferences in the estimation of the model, see for example Moffitt (1984) and Blundell and Shephard (2012). Dagsvik and Jia (forthcoming) discuss identification issues in a setting when there is unobserved heterogeneity in the wage equation and where tax-payers have preferences for jobs (which is a reasonable extension of the standard discrete choice model if one would like to accommodate for effects through wages). Another approach is to let the wage be determined by a suitable “after-model” to account for general equilibrium effects on wages, see Creedy and Duncan (2005) and Peichl and Sieglöck (2012).

² It can be argued that the discrete choice version of structural modeling is a more practical method than the conventional continuous approach, based on marginal calculus. The structural labor supply model associated with Hausman (Hausman, 1985) becomes very complicated when more general and flexible model specifications are used, see Bloemen and Kapteyn (2008).

متن کامل مقاله

دریافت فوری ←

ISIArticles

مرجع مقالات تخصصی ایران

- ✓ امکان دانلود نسخه تمام متن مقالات انگلیسی
- ✓ امکان دانلود نسخه ترجمه شده مقالات
- ✓ پذیرش سفارش ترجمه تخصصی
- ✓ امکان جستجو در آرشیو جامعی از صدها موضوع و هزاران مقاله
- ✓ امکان دانلود رایگان ۲ صفحه اول هر مقاله
- ✓ امکان پرداخت اینترنتی با کلیه کارت های عضو شتاب
- ✓ دانلود فوری مقاله پس از پرداخت آنلاین
- ✓ پشتیبانی کامل خرید با بهره مندی از سیستم هوشمند رهگیری سفارشات