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Journal of Public Economics 92 (2008) 1738–1750

JOURNAL OF PUBLIC ECONOMICS

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Optimal grouping of commodities for indirect taxation ☆

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Received 4 May 2007; received in revised form 18 January 2008; accepted 22 January 2008
Available online 14 February 2008

Abstract

Indirect taxes contribute to a sizeable part of government revenues around the world. Typically there are few different tax rates, and the goods are partitioned into classes associated with each rate. The present paper studies how to group the goods in these few classes. We take as given the number of tax rates and study the optimal aggregation (or classification) of commodities of the fiscal authority in a second best setup. The results are illustrated on data from the United Kingdom.

JEL classification: H21; H23
Keywords: Indirect tax; Ramsey; Aggregation

1. Introduction

The French government recently wanted to change the rate of the value added tax bearing on meals taken in restaurants, but the European Union did not accept France's demand. The standard theory of indirect taxation would possibly recommend to tax restaurants at a higher rate than fast food places, e.g. because rich households spend a larger fraction of their income in restaurants than the less well-off. This theory, however, does not take into account a strong constraint imposed on EU members. Indeed, according to the 92/77 directive, EU members are allowed to set only one or two reduced (low) rates in addition to the standard (high) tax rate, so that they are forced to impose the same rate on many different commodities. The purpose of this paper is to describe how different commodities should be grouped when there is a constraint on the number of tax rates.

☆ We are indebted to the editor Robin Boadway and to two anonymous referees for their constructive remarks. We are most thankful to Ian Crawford, from the Institute for Fiscal Studies, who computed the elasticities and budget shares in the U.K., which we use in the empirical application. We have benefited from the comments of Stuart Adam, Richard Blundell, Martin Browning, Jean-Marc Robin, Stephen Smith. We also thank the participants in seminars at CREST and IFS. The usual disclaimer applies.
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doi:10.1016/j.jpubeco.2008.01.010

The Ramsey tax rule usually assumes that different commodities can be taxed at different rates, and when consumers have heterogeneous tastes and income, the optimal tax rates typically differ across goods.[1] In a partial equilibrium framework, assuming no substitution between goods, each commodity is assigned two numbers: its demand elasticity with respect to own price and its social weight, which reflects its relative usage among the poor and wealthy in the population. For a given social weight, the optimal tax rate is inversely proportional to the price elasticity; and, given the elasticity, the tax rate decreases with the social weight.

The situation where the number of available tax rates is smaller than the number of taxable goods has received little attention in the literature. Two previous theoretical papers are relevant. Gordon (1989) studies an economy where all goods are initially taxed at the same rate, and considers small changes in a tax reform perspective. Belan and Gauthier (2004, 2006) study the case of low (close to zero) levels of collected tax in a single agent framework with a finite number of goods. They find that the optimal tax rate bearing on a good is weakly decreasing in the price elasticity. To the best of our knowledge, there is no applied analysis of this issue.

In this paper, we depart from Belan and Gauthier (2006) by considering a continuum (instead of a finite number) of taxable commodities. Each good is assumed to be negligible with respect to the total, so that it is possible to change the tax rate bearing on an elementary commodity while leaving unchanged the whole tax structure and the marginal cost of public funds. This allows us to consider arbitrary (far from zero) levels of taxes and to derive simple properties of the optimum. We also take into account heterogeneity and equity concerns. The theoretical predictions are used to study whether actual tax systems depart from optimality. We give a first look at this topic on data from the UK. The assumption that the observed tax rates are optimal provides information on the underlying social welfare function, which in turn puts restrictions on how to tax the goods.

The continuum assumption allows us to partially characterize the optimal grouping structure with the help of a *purported tax rate*. Such a rate is defined as the one that the social planner would apply to a good if this good could be taxed freely, while keeping unchanged the tax rates supported by the other commodities, fixed at their constrained optimum values. If social welfare satisfies a single-peakedness property with respect to tax rates, the highest attainable welfare must be at one of the typically two rates which are the closest to the ideal rate, on either side of this rate. It remains some uncertainty, at this stage, concerning the exact conditions under which a given good should be taxed at one particular rate, among the two relevant candidates.

In practice, it is unlikely that reliable information be available on how price elasticities change with prices. If one focuses attention on the particular case where the price elasticities and social weights do not vary with the tax rates, then one can fully characterize the tax structure, and answer the question about the exact conditions under which any individual good should be taxed at a given rate. The result is clear-cut: the Ramsey monotonicity properties are shown to be weakly satisfied. That is, given the price elasticity, the tax rate is non-increasing with the social weight, and similarly, given the social weight, the tax rate is typically non-increasing with the price elasticity.

The previous argument provides insights on whether a given actual fiscal scheme is optimal and why it may not be. In order to apply these results to data from the United Kingdom, we extend the analysis to the case in which cross price effects are not zero. We assume that the observed rates on the existing groups are optimally chosen. This yields constraints on the implicit redistributive aims of the government. It appears that the social weights that best fit the current tax scheme put most of the weight on the population segment associated with the middle of the consumption distribution, the fourth and fifth deciles. For these social weights, the actual commodity groupings do not look far from optimality. The main departures concern goods whose taxation is likely to rely on other considerations, environment or public health considerations, than mere redistribution. Thinking of the French demand to the European Union, in the UK, ‘Food out’, which comprises restaurants and fast food places, is currently taxed at the standard rate, but appears to be too heavily taxed. Our analysis actually suggests that some items in this group should be exempted from any tax.

[1] See Saez (2002). When the consumers have the same tastes and when their labor supplies are separable from their demands for commodities, nonlinear income taxation yields a uniform taxation of all the goods (Atkinson and Stiglitz, 1976 and Mirrlees, 1976). Apart from non-separability and/or heterogeneous tastes, optimal indirect tax rates may differ across commodities for certain types of production functions (Stiglitz, 1982; Naito, 1999 or Saez, 2004), if it is possible to evade tax (Boadway et al., 1994), in order to correct externalities (Green and Sheshinski, 1976), in presence of uncertainties (Cremer and Gahvari, 1995), or when the authority implementing direct taxes is not perfectly coordinated with the one that designs indirect taxes, possibly because the decisions are taken at different points in time or in space (federal, state or city levels).