Journal of Public Economics 81 (2001) 231–251
JOURNAL OF PUBLIC ECONOMICS
www.elsevier.nl/locate/econbase

The efficiency of indirect taxes under imperfect competition

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Received 31 December 1999; accepted 29 February 2000

Abstract

This paper considers the relative efficiency of ad valorem and unit taxes in imperfectly competitive markets. We provide a simple proof that ad valorem taxes are welfare-superior to unit taxes in the short run when production costs are identical across firms. The proof covers differentiated products and a wide range of market conduct. Cost asymmetries strengthen the case for ad valorem taxation under Cournot competition, but unit taxation may be welfare-superior under Bertrand competition with product differentiation. Ad valorem taxation is superior with free entry under Cournot competition, but not necessarily under price competition when consumers value variety.

Keywords: Excise tax; Unit tax; Specific tax; Ad valorem tax; Tax efficiency; Product differentiation; Imperfect competition

JEL classification: D43; H21; H22; L13

1. Introduction

Tax authorities have raised revenue through indirect selective sales taxes (excise taxes) since the first known civilization began in Sumer, Babylonia some 6000

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0047-2727/01/$ – see front matter
PII: S0047-2727(00)00085-2

years ago. ‘‘Everything’’ in Sumer’s city-state of Lagash was taxed,[1] from sheep-shearing (five shekels to the *ishakku*) to divorce (five shekels to the *ishakku* and another to the vizier) to perfume preparation (five shekels to the *ishakku*, a shekel to the vizier, and another to the palace steward). Wealth and property were ‘‘taxed to the limit.’’ Even the dead could not be buried until an excise was paid. Historians emphasize the capaciousness of Lagash’s tax policy, which is said to have ultimately lead to its invasion and destruction. More importantly, the form of the excises may have been inefficient as well.

Most modern governments also derive substantial revenue from excise taxes. Some governments impose very large excises. The Israeli government, for example, imposes a 95 percent ad valorem luxury excise on all private automobiles in addition to a 17 percent value added tax and 7 percent customs tax on certain imports (Fershtman et al., 1997). Both unit (specific) and ad valorem (percentage) rates are applied at all levels of government, sometimes on the same classes of commodities.[2] The form of tax can have a substantial impact on social surplus. This paper provides a general approach for comparing efficiency across the two types of excise instruments.[3]

The relative efficiency of unit and ad valorem taxes is unambiguous for the polar cases of perfect competition and monopoly. Under perfect competition, the two tax types are equivalent; unit and ad valorem taxes constructed to raise the same amount of revenue lead to identical economic outcomes (both taxes shift the perceived demand curve down by the same amount at its intersection with supply). Under monopoly, an ad valorem tax is welfare superior to a unit tax that yields the same revenue because it renders the effective demand curve more elastic and so encourages production.

Most market structures fall between these two extreme cases – firms are neither so small as to effectively take the market price as given (with some exceptions, such as agricultural markets), nor are there many cases of private-sector firms without any competition. The predominant market form is oligopoly. Most of the work on taxation under imperfect competition has analyzed Cournot (quality) competition with a homogeneous product.[4] The main rival is the Bertrand (price) model with differentiated products. Products sold by firms are typically differentiated so that firms retain some market power even when there are many of them. Inappropriate assumptions about market structure and firm behavior can mislead policy analysis.

[1]Interpretation by Adams (1993) with additional information from Kramer (1959).

[2]For example, the federal government levies a $3 per passenger excise on transportation if by water, 10 percent if by air; surface coal is taxed at the lesser of $0.55 per ton or 4.4 percent of the sale price.

[3]For simplicity, we consider each tax type in isolation and do not allow for combinations (see Myles, 1996). We consider distributional issues in Anderson et al. (2001).

[4]See, e.g., Seade (1987), Stern (1987), Besley (1989), Delipalla and Keen (1992), Skeath and Trandel (1994), and Keen’s (1998) comprehensive survey paper.